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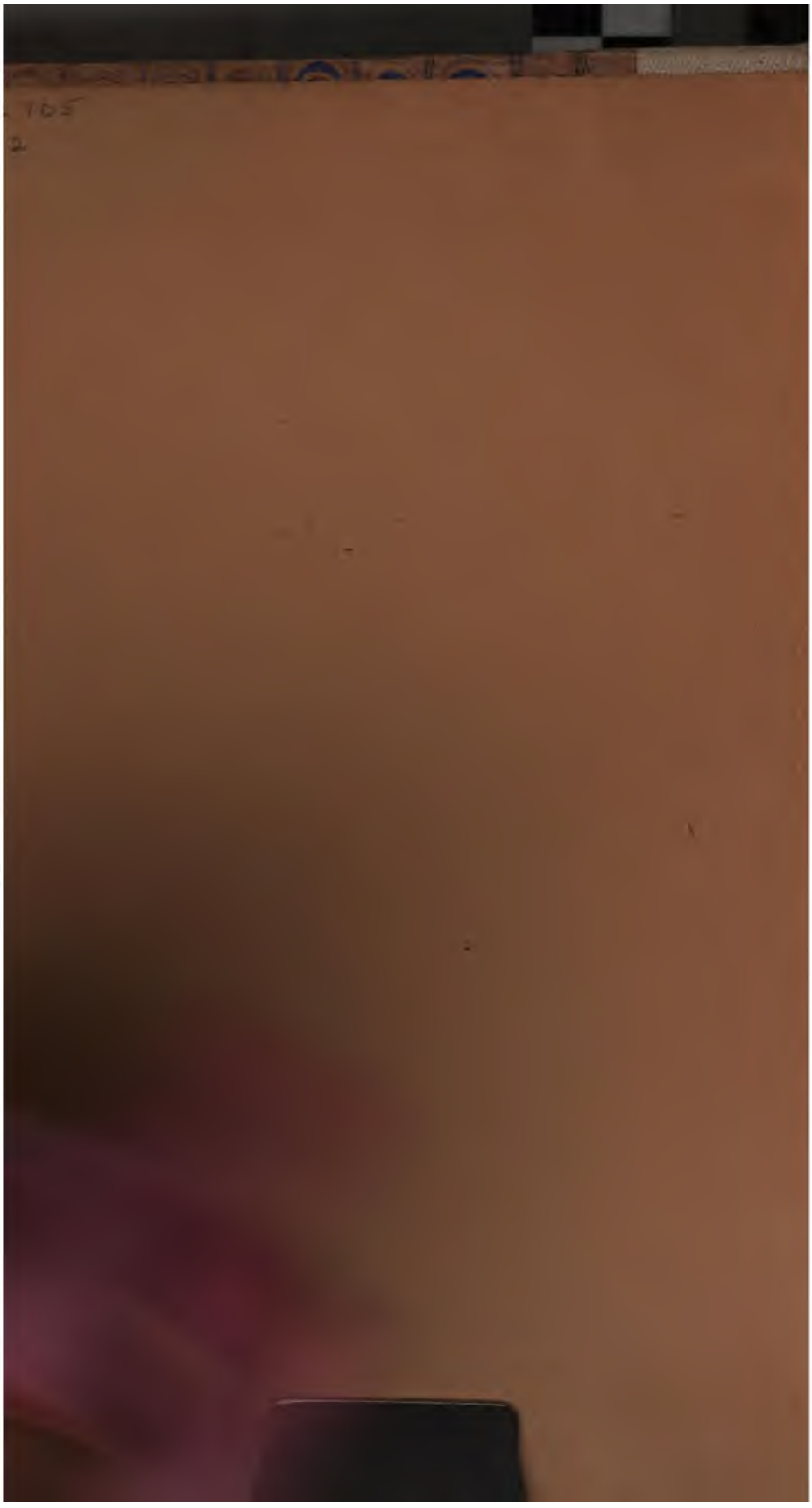

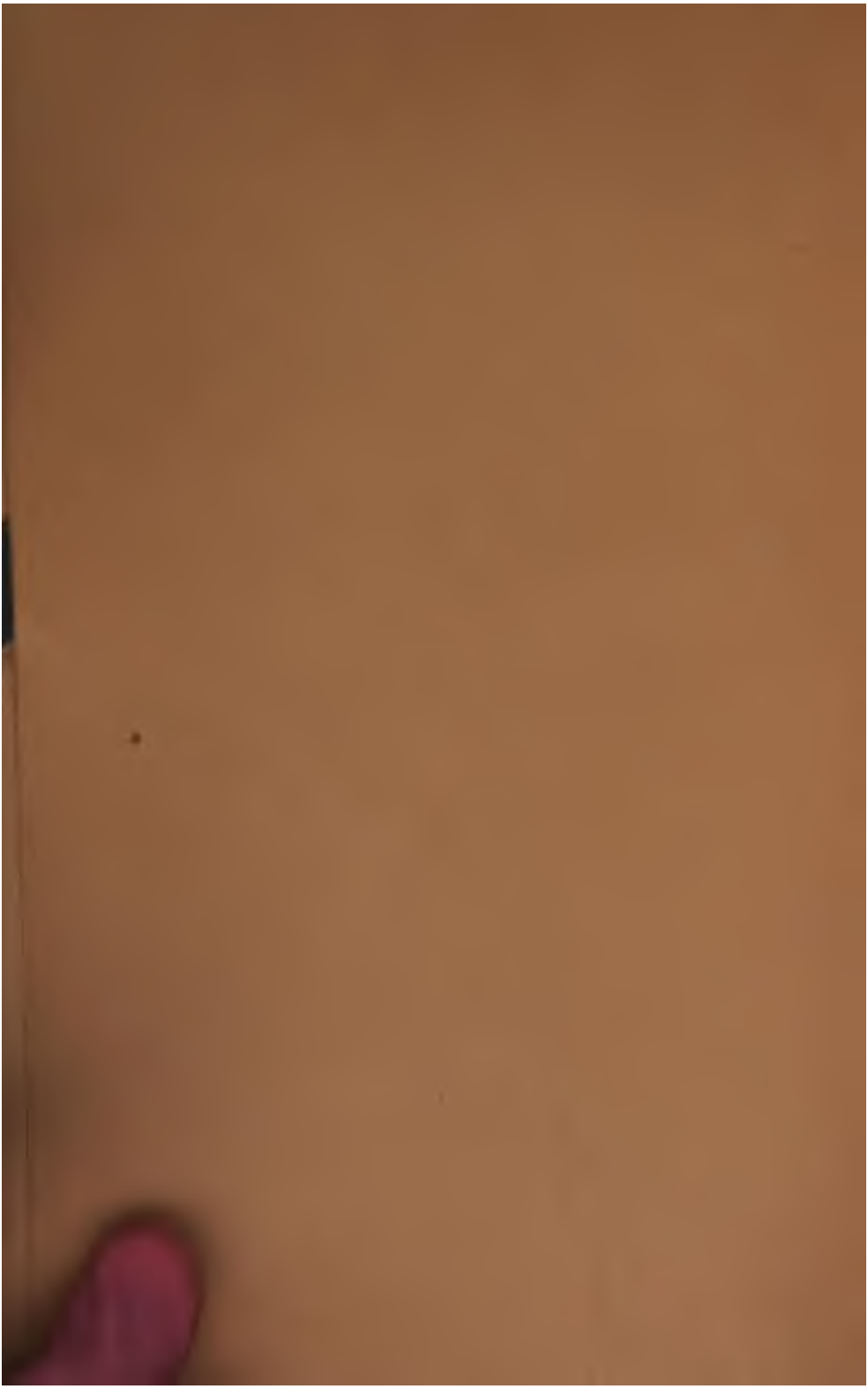

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The Canadian Entomologist

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REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

JANUARY, 1904.

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WANTED.—North American *Geometridæ*, eastern and southern species (many of the commonest). Offered: Lepidoptera, Coleoptera and Hemiptera, named, from British Columbia. GEO. W. TAYLOR, Wellington, B. C.

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EUROPEAN COLEOPTERA.—I have a large quantity of European Coleoptera which *I wish to exchange for American*. Lists furnished. PAUL J. ROELOFS, 90 Rue van *Strælen, Antwerp, Belgium.*

The Canadian Entomologist

VOLUME XXXVI.

Thecla strigosa, Harr.

EDITED BY

Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C.

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THE REV. GEORGE WILLIAM TAYLOR, F.R.S.C., F.E.S., F.Z.S.

The readers of the Canadian Entomologist will be pleased, we feel sure, to see the good portrait given herewith of the Rev. G. W. Taylor, who, during the last twenty years, has done such excellent work in almost all lines of Natural History in British Columbia. Born in 1854, in Derby, England, where he received his education, Mr. Taylor, after leaving school, studied mining engineering, but in 1882 came out to Canada and went at once to British Columbia, where he had relatives. Although engaged for a short time in farming, he began almost immediately to study for the ministry, and in 1884 was ordained by the Bishop of Columbia. Since that time, with the exception of two years, from September, 1888, to August, 1890, which he spent in Ottawa as rector of the joint parishes of St. Barnabas and Holy Trinity, he has been in charge of parishes in British Columbia, and at the present time is rector of the Church of England at Wellington, B. C. From boyhood Mr. Taylor has been keenly interested in Natural Science, and from his enthusiasm and industry has accomplished much, not only in doing original work of importance in several lines of Zoology and Palæontology, but in constantly encouraging and assisting others with whom he came in contact, to take up and enjoy with him his favourite studies.

Mr. Taylor has for many years been a Fellow of the Entomological and Zoological Societies of London, England, and in 1884 was elected a Fellow of the Royal Society of Canada in recognition of his eminent services to science, particularly in connection with his investigations in Canadian Conchology and Entomology. In 1887 he was appointed Honorary Provincial Entomologist of the British Columbian Department of Agriculture, and sent out a circular letter to farmers, drawing their attention to the losses caused by insects and asking their co-operation. Owing to his removal to eastern Canada in 1888, this work was relinquished before any report was issued. Several important papers have appeared from his pen in the Transactions of the Royal Society of Canada, the Canadian Entomologist, the Ottawa Naturalist and the Nautilus. Many

new species have been discovered by this energetic worker, and several have been named after him. Among insects, species which have been mentioned in this magazine are *Melitæa Taylori*, Edw. *Anthelia Taylorata*, Hulst, *Ichneumon Taylori*, Harrington, *Trichiosoma Taylori*, Provencher, and *Adranes Taylori*, Wickham. All orders of insects, however, have been studied, and several other species in different orders from those named have been or are being named after the subject of this sketch. Some of Mr. Taylor's best work has been done on the Mollusca, and naturally several new species have been called after him; among those which occur to us are *Pristoloma Taylori*, Pilsbury, *Modiolaria Taylori*, Dall, and *Phyllaphysia Taylori*, Dall; in addition a new species of sponge, *Leucandra Taylori*, Lambe, may be mentioned.

Enormous and valuable collections of British Columbian specimens of various kinds have been made, and generally sent off to specialists in all parts of the world. Mr. Taylor, possesses himself the largest private collection of Limpets (Patellidæ and allied families) in the world; also the most complete collection of Unionidæ in Canada, and one of the largest general collections of land and water shells (7,000 species) in Canada.

A constant collector of insects, Mr. Taylor has also amassed valuable collections in several orders, notwithstanding the fact that he has made a practice continually of giving away to specialists any specimens which were required for study. His cabinets contain a wealth of representative specimens of inestimable value to the many beginners who have been stirred up by his enthusiasm to investigate the insect fauna of our Pacific Coast Province. At the present time he is devoting all his energies to the working up of the North American Geometridæ, paying particular attention to northern species which are likely to occur in Canada. Since the death of the Rev. G. D. Hulst, this important family of moths has been somewhat neglected by American students. Mr. Taylor's methods of work are systematic and thorough. First securing all the literature on the subject under consideration, he then strives to acquire types for study from the original localities, compares them with the descriptions, and then with extensive series of specimens from as wide an area as possible. He is an indefatigable collector and generous correspondent, who considers no trouble too much to make observations or secure specimens when specially desired. In his parish work he is painstaking, gentle and self-denying, always ready to help; a clear and forcible preacher, and an earnest liver who shows in his works that religion is not an accessory of everyday life, but an integral part of it.

J. F.

OTTAWA FIELD-NATURALISTS' CLUB.

The 25th anniversary of the foundation of this active and useful organization was celebrated in the large assembly hall of the Normal School on Tuesday evening, December the 15th, and proved of much interest to the large audience present. The inaugural address of the president, Mr. W. T. Macoun, dealt with the present work of the Club, and of projects for the future. Principal White, of the Ottawa Normal School, in a concise and well-expressed address of welcome, attested to the public appreciation of the efforts of the Club, and the important work they were engaged in in connection with the educational institutions of the city. All the speakers were members of the first Council of the Club in 1879.

Lieut.-Col White, C. M. G., the first president of the Club, spoke upon Natural History at Ottawa before the formation of the Club, giving many pleasing reminiscences of former workers, and the difficulties under which they laboured.

Mr. Robert B. Whyte spoke upon "Botanical Conditions around Ottawa twenty-five years ago." He went carefully over the old hunting-grounds, many of which are now covered with buildings, and recalled with pleasure the finding of special rarities, and the companionship of friends bound together by ties of mutual scientific interest. He spoke particularly of the delight of the Honourable Joseph Martin, who at that time was an enthusiastic student of botany, when he found his first plant of the Showy Lady's Slipper.

Dr. Fletcher dealt with "Ottawa as a Natural History locality twenty-five years ago." He reviewed in order the old localities which were most productive for the naturalist, mentioning some of the rarer objects found, and drew attention to the changes which had obliterated some of these since the Club started; but pointed out that there was still much to be done close to, or even within the city limits, in the different branches of Natural History. Reference was made to the great stimulus given to scientific work in Ottawa by the advent of the Geological Survey of Canada.

Lieut.-Col. Anderson gave an address upon the "Workers in Natural History at Ottawa twenty-five years ago," paying a tribute to the good work done, and to the constancy with which the enthusiasm had been kept up. A striking feature was the encouragement which had always been given to beginners by the leaders.

Dr. H. B. Small's subject was, "What the Ottawa Field Naturalists' Club has accomplished." He recalled many interesting characters and

incidents connected with the foundation of the Club, showing how it had developed from a mere bond, holding a few enthusiasts together, into an active and influential organization, taking an important part in the educational development of the country. In addition to having in a large measure effected its prime object of working up the local natural history of the Ottawa district, it had provided opportunities for delightful recreation and improvement to the many hundreds, or even thousands, of lovers of the country and of natural history, who had, during the twenty-five years, attended the excursions and evening meetings where the popular presentation of science had always been kept well to the front.

The meeting ended with short and appropriate speeches by Dr. Robert Bell, the director of the Geological Survey, and Prof. Macoun, the eminent botanist. A vote of thanks was proposed by Mr. W. H. Harrington, and seconded by Mr. James Ballantyne, in a happy manner.

A NEW FOOD-PLANT FOR THE COMMON SPRING BLUE.

Cyaniris ladon, Cramer, *a. lucia*, Kirby.

This is the new name for our old friend, *Lycæna pseudargiolus*, var. *lucia*.* An interesting observation was made on the oviposition of this species by Mr. C. H. Young, of Ottawa. On June 4th, when at Meech Lake, Que., noticing a female *lucia* fluttering around a patch of the common Ox-eye Daisy, *Chrysanthemum leucanthemum*, L., he watched it carefully and saw that it was laying eggs upon the buds of this plant. In no case was a full-blown flower visited, the eggs being invariably laid on the small buds, which were from a quarter to three-eighths of an inch in diameter. After watching the insect for some time, the three last buds visited were gathered and the eggs secured. The operation of egg-laying was, as is usually the case with this species, as follows: Settling on the top of a flower, the female crawled to the edge of the bud, and then turning her abdomen down beneath it thrust the egg as far out of sight as possible, just at the base of the bracts, where there is a slight swelling which hides them to a certain extent. The only plants belonging to the Compositæ recorded by Dr. Scudder as food-plants of *Cyaniris ladon (Pseudargiolus)* are *Verbesina helianthoides* and *Actinomeris squarrosa*, neither of which occurs in Canada. The other plant inadvertently stated by Dr. Scudder as belonging to the Compositæ, *Dimorphanthus mantchuricus*, is a member of the Ginseng family, Araliaceæ.—J FLETCHER.

CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

BY WILLIAM H. ASHMEAD, M. A., D. SC., ASSISTANT CURATOR, U. S. NATIONAL MUSEUM.

(Paper No. 18.—Continued from Vol. XXXV., p. 332.—Conclusion.)

SUBFAMILY II.—Ephutinæ.

This subfamily is readily separated from the *Mutillinæ* by the difference in the abdomen, both sexes having the first segment much narrowed, or petioliform, and separated from the second by a more or less distinct constriction or furrow; it is never broadly sessile with the second as in the *Mutillinæ*.

The group is based upon the genus *Ephuta*, Say, as I have restricted it, but not as defined by André. Say, in his original brief description, designated no type for the genus, but placed under it *three* species, namely, *Mutilla erythrina*, Klug; *M. scrupea*, Say, and *M. gibbosa*, Say. When I recognized the genus I designated as the type *E. scrupea*, Say, the only species I knew in both sexes. As I was the first to designate a type for it, my views should prevail; in fact, must prevail under the rules of zoological nomenclature.

The genus *Rhoptromutilla*, André, is *Ephuta*, Say, as I defined it under a new name.

Of my genus *Allomutilla* Mr. André says: "Ce genre a été fondé par Ashmead sur le ♂ de *D. melicerta*, a Smith, qui d'après l'auteur cité, présenterait cette particularité d'avoir les deux nervures récurrentes recues par la seconde cellule cubitale, or cette assertion est erronée, car chez le ♂ en question dont j'ai pu examiner plusier examplaires, les nervures recurrentes sont recues comme d'ordinaire, par le 2e et 3e cellules cubitales."

My definition is correct, and André's several examples of *M. melicerta*, Smith, probably represent some other species. Radoszkowski, in Horæ Soc. Ent., Rossicæ, Vol. VI., 1869, Pl. 10, Fig. 4, gives a good figure of *M. melicerta*, Smith, and if Mons. André will consult this figure he will see that *the second cubital cell receives both recurrent nervures*, as I have stated. Another species figured by Radoszkowski, *Mutilla egregia*, Klug, also has the same venation and will fall into *Allomutilla*, Ashmead.

The subfamily *Ephutinæ* is divided into two tribes as follows:

Table of Tribes.

Eyes never rounded or hemispherical, but always ovate, obovate or ellipsoidal, not polished, and distinctly facetted, as in the tribe *Mutillini*.....Tribe I., Ephutini.

Eyes rounded or hemispherical, very prominent and highly-polished, not facetted, or the facets very indistinctly defined, as in the tribe *Photopsidini*.....Tribe II., Sphaerophthalmini.

Tribe I.—Ephutini.

Table of Genera.

Males.....1.

Females.....9.

1. Eyes distinctly emarginate within.....2.

Eyes *not* emarginate within.....4.

2. Metathorax with the hind angles normal, not dentate; scutellum normal, not spined.....3.

Metathorax with the hind angles dentate, clothed with a dense silvery-white pubescence; scutellum bispined. (North and South America).....Ephutopsis, Ashm., gen. nov.

(Types E. trinidadensis, Ashm., and M. odontophora, Cam.)

3. Second and third cubital cells each receiving a recurrent nervure.

Scape bicarinate beneath, the first and second flagellar joints transverse, or not longer than thick; first segment of abdomen petioliform, as wide at base as at apex. (North and South America.).....Ephuta, Say.

= Rhoptromutilla, André.

(Type E. scrupea, Say.)

Scape (?) not bicarinate beneath; first segment of the abdomen narrowed anteriorly, nodiform posteriorly.

(Africa.).....Rhopalomutilla, André.*

(Type R. clavicornis, André.)

Second cubital cell receiving both recurrent nervures; scape normal.....Allomutilla, Ashmead.

(Type Mutilla melicerta, Smith.)

4. Front wings with *three* cubital cells, or the third partially formed...5.

Front wings with *two* cubital cells, the third entirely absent.....6.

*I have not seen a specimen of this genus, and am not positive of its position in this tribe.

5. Middle and posterior tibiæ *not* spinous; second ventral segment with a longitudinal impresssion on each side filled with a dense pubescence. (Europe, Africa and Asia.).....Stenomutilla, André. (Type Mutilla argentata, Villiers.)

Middle and posterior tibiæ spinous; second ventral segment normal. (Europe, Africa and Asia.).....Dasylabris, Radoszowski. (Type Mutilla arenaria, Fabr.)

6. Head normal, unarmed.....7.

Head abnormally large, quadrate, armed on each side beneath with a tooth or spine, the hind angles acute or straight.....8.

7. Stigma in front wings indistinct; mesonotum *without* furrows, or the furrows only slightly indicated; first joint of the flagellum shorter than the second.....Dasylabris, Radoszk. (partim.)

Stigma in front wings well developed; mesonotum *with* distinct furrows. (Europe and North Africa.).....Cystomutilla, André. (Type Mutilla ruficeps, Smith.)

8. Marginal cell squarely truncate at apex; second recurrent nervure subobsolete; first joint of the flagellum longer than the second. (North and South America.).....Hoplomutilla, Ashmead. (Type Mutilla cephalotes, Swederus.)

9. Thorax obpyriform, ovate or ovoid; head not unusually large....10.

Thorax banjo-shaped, or nearly; head very large, quadrate, about twice as wide as the thorax.....16.

10. Pygidium smooth, *without* a pygidial area, or at most the area only slightly indicated, rarely finely, sparsely punctate.....11.

Pygidium not or rarely smooth, opaque, striate or rugulose, always *with* a distinct pygidial area.....14.

11. Thorax bare, or with only a few sparse hairs; eyes ovate or oval; first abdominal segment petioliform, as wide at base as at apex; metathoracic spiracles round or short oval.....12.

Thorax not bare, densely pubescent above; eyes ellipsoidal or short oval; first abdominal segment subnodose at apex; metathoracic spiracles long, linear.....13.

12. Head transverse, much wider than the thorax, the temples obliquely narrowed; eyes rather large, oval.....Ephutopsis, Ashmead.

Head transverse or subglobose, not much wider than the thorax; eyes ovate or oval; flagellum not long, either subclavate or clavate, the first joint transverse, a little shorter than the second, the following short, wider than long; hind tibiæ with a few sparse hairs.....Ephuta, Say.

13. Head subglobose ; flagellum filiform, the first joint obconical, longer than the second, the following joints longer than thick ; mandibles with a tooth within before apex.....Stenomutilla, André.

14. Thorax longer, obpyriform or obovate.....15.

Thorax short, obovoid, above bare or nearly ; metathoracic spiracles (?) oval ; mandibles bidentate ; abdomen red and black, with the first segment petioliform, of an equal width throughout.....Allomutilla, Ashmead.

15. Thorax bare ; head subquadrangular ; eyes very small, placed towards the middle of the sides of the head ; antennæ very short, strongly clavate, the joints of the flagellum wider than long.....Rhopalomutilla, André.

Thorax usually densely pubescent, the metathoracic spiracles long oval ; mandibles tridentate at apex, or with one or two teeth within before the apex ; antennæ neither very short nor strongly clavate, the first joint of the flagellum longer than the second ; abdomen usually spotted with silvery-white or golden pubescent spots, the petiole short, widest behind.....Dasylabris, Radoszkowski.

16. Head with the hind angles acute or dentate, armed beneath with *four* teeth, *i.e.*, two small teeth at base of gula and a large tooth on each side behind these ; mandibles bidentate, the lower tooth much the longer.....Hoplomutilla, Ashmead,

Tribe II.—Sphaerophthalmini.

The members of this tribe exhibit the strongest affinity with those in the tribe *Photopsidini*, and many females are easily confused with some in the latter.

The closest attention, therefore, must be given to the difference in the shape of the first abdominal segment, made use of in separating the tribes, before they can be recognized.

Table of Genera.

Males.....1.

Females.....7.

1. Fully winged.....2.

Subapterous or with rudimentary wings.

Thorax ovoid, coarsely sculptured, or rugosely punctured, with a black pubescence ; head rather large, quadrate, wider than the thorax ; eyes small, rounded ; mandibles 3-dentate ; first joint of the flagellum not short, but hardly longer than the second. (North America.).....Pycnomutilla, Ashm., gen. nov.

(Type Mutilla waco, Blake.)

2. Front wings with only *two* cubital cells.....3.
Front wings with *three* cubital cells, or the third partially formed..7.
3. Marginal cell at apex broadly truncate.....4.
Marginal cell at apex pointed or rounded, never truncate.
4. Mandibles at apex broad and 3-dentate.....5.
Mandibles at apex never broad nor 3-dentate, at the most bidentate 6.
5. Body bare, or nearly; second dorsal abdominal segment not black, red or marked with red or yellow spots. (North and South America.).....Sphaerophthalma, Blake.
=Traumatomutilla, André.
(Type S. scaeva, Blake.)
Body not bare or nearly, usually very hairy or pubescent; second dorsal abdominal segment usually black or unicolorous, not spotted with red or yellow. (North and South America).....Dasymutilla, Ashmead.
(Type Sphaeroph. gorgon, Blake.)
6. Body well pubescent or hairy, the abdomen black, with a white hair-band; first joint of the flagellum shorter than the second. (South America.).....Reedia, Ashm., gen. nov.
(Type Mutilla atripennis, Spinola.)
7. Thorax obpyriform or obovate, or at least always narrowed posteriorly.
Mandibles at apex *not* 3-dentate, edentate, or with a small tooth within some distance from the apex, or bidentate..... 8.
Mandibles at apex obliquely truncate and 3-dentate.
First joint of the flagellum obconical, but not twice as long as the second; head and thorax usually black, with a sparse black pubescence, rarely with the head red; second abdominal segment mostly red....Pycnomutilla, Ashmead.
8. Body bare or nearly, never densely pubescent, or hairy, usually rugosely punctured; scape rather long, slightly bent, the first joint of the flagellum longer than the second; second abdominal segment marked with from 2 to 4 red or yellow spots, rarely immaculate.....Sphaerophthalma, Blake.
=Traumatomutilla, André.
Body *not* bare, but clothed with dense long hairs or densely pubescent, or the head and thorax above with a dense pubescence; second abdominal segment usually black or the *derma* not spotted, although the segment is sometimes spotted with two or more pubescent spots.....Dasymutilla, Ashmead.

SEVERAL NEW DIPTERA FROM NORTH AMERICA.

BY D. W. COQUILLETT, WASHINGTON, D. C.

Family CULICIDÆ.

Culex Dupreei, new species.— Female. Near *serratus*, but much smaller, the white-scaled median vitta of the mesonotum broader, widening posteriorly where it is wider than the brown lateral portion, etc. Black, the bases of antennæ, lower part of pleura, the metanotum, basal portion of venter, coxæ, and femora, yellowish; scales of palpi black, those of occiput white, and with a spot of black ones each side; scales of middle of mesonotum white, those on the sides brown, on the pleura and scutellum white; scales of abdomen brown, those in the basal angles of the segments and on the venter white; scales of femora yellowish, those on front side of first two pairs, and on apical portion of upper side of hind ones, chiefly brown, those of tibiæ and tarsi brown; tarsal claws toothed; wings hyaline, lateral scales of the veins narrow and linear, petiole of first submarginal cell about one-third the length of that cell, hind crossvein about its length from the small; length, slightly over 2 mm.

Male.—Colours as in the female, but the mesonotum nearly covered with white scales; penultimate joint of palpi considerably dilated, the last joint narrow, front and middle tarsi with one tooth under one of the claws, none under the other, petiole of first submarginal cell nearly as long as the cell.

Baton Rouge, Louisiana.—A specimen of each sex received from Mr. J. W. Dupree, after whom the species is named. Type No. 7340, U. S. National Museum. Mr. Dupree writes that the eggs and larvæ of this species are very distinct from those of *serratus*. A small series bred by Dr. J. B. Smith, at New Brunswick, New Jersey, has also been examined.

Conchyliastes varipes, new species.—Near *musicus*, but the last joint of the hind tarsi is brown. Black, the front and hind femora, except their broad apices, the posterior side of the middle femora except their apices, and the stems of the halteres, yellow, the fourth joint of the hind tarsi white; scales of palpi violaceous, those of the occiput yellowish white and with a patch of violaceous ones on either side; (mesonotum abraded; what scales remain are yellowish white and a few black ones along the middle); scales of abdomen violet blue, those on sides of first two

segments, hind angles of the others except the last one, under surface of each segment except the last one and base of the preceding, whitish; scales on yellow portion of femora yellowish white, those on the remainder and on tibiæ violet blue, those on the tarsi black except on the fourth joint of the hind tarsi, where they are white, claws of front tarsi toothed; wings grayish hyaline, veins and scales brown, petiole of first submarginal cell from two-fifths to three-fifths as long as that cell, hind crossvein less than its length from the small; length, 4 mm. Five female specimens. Type No. 7341, U. S. N. M.

Las Penas and Tonala, Mexico (Dr. A. Dugès), and Agricultural College, Mississippi (May 18, Glenn W. Herrick).

Family CHIRONOMIDÆ.

Metriocnemus Knabi, new species.—Black, the knobs of the halteres whitish, hairs of antennæ brown, those of the body yellowish; mesonotum somewhat polished, front tibiæ twice as long as the first joint of their tarsi, hind tibiæ outwardly fringed with rather long hairs, all tarsi with a short pubescence, but without hairs, the fourth joint slender and longer than the fifth; wings grayish hyaline, densely covered with brown hairs, third vein almost straight; length, 1.25 to 2 mm Two males and four females bred by Mr. Fred Knab, after whom the species is named. Type No. 7321, U. S. N. M.

Westfield, Massachusetts. This European genus of Chironomidæ has not heretofore been recorded from this country.

Family OESTRIDÆ.

Cuterebra grisea, new species.—Near *fontinella*, but the hairs of the mesonotum are whitish; also near *scutellaris*, but the last abdominal segment is largely opaque, gray pruinose. Black, the abdomen and legs dark reddish brown; front at vertex one and one-half times as wide as either eye, its hairs black and with several yellow ones on the lower portion, two gray pruinose spots along each eye and one on either side of insertion of antennæ; face and cheeks densely gray pruinose, the upper portion of sides of face broadly, a triangular spot on either side of lower part of facial cavity, a small spot at lower end of each eye and one nearly midway between it and the oral margin, also two streaks along the anterior portion of the latter, polished, margins and lower portion of facial depression, except in the middle, also polished, hairs of face and cheeks whitish, those on upper portion of face chiefly black; (antennæ wanting);

thorax gray pruinose, its hairs whitish, those of the hypopleura, middle of breast and scutellum black, a row of three polished spots near the lower front corner of the pleura; abdomen polished, the last segment and venter of the last three gray pruinose, several spots and the hind margin of the last segment polished, hairs of abdomen black, those of the last segment and venter of the last three chiefly yellow; legs polished, an elongate, whitish pruinose spot on front side of middle femora, hairs black, those on inner side of apical half of front tibiæ golden yellow, on inner side of other tibiæ chiefly white; wings brown, veins yellow, calypteres dark brown; length, 15 mm.

Fort Simpson, B. C., Canada. A single specimen collected by the Rev. J. H. Keen, and submitted for naming by Dr. James Fletcher, to whom the type has been returned.

Family SCIOMYZIDÆ.

Bischofia varia, new species.—Black, the head except middle of face, basal half of antennæ, mouth-parts, pleura, sternum and scutellum, reddish brown, the halteres, sides of abdominal segment, coxæ, trochanters, middle legs except apical half of femora, and nearly basal half of hind femora, yellow; head and body polished, frontal lunule hidden, antennal arista sparsely long-plumose, face strongly produced forward at the oral margin, mesonotum bearing two pairs of dorsocentral bristles, no acrostichals, mesopleura bare, pteropleura bearing two bristles, one above the other, and several short hairs, sternopleura covered with short hairs, hind femora without long hairs or bristles on the under side; wings hyaline, veins broadly bordered with brown, least distinct on the sixth vein, tip of first vein slightly before the small crossvein, calypteres whitish; length, 6 mm.

Rigaud, Quebec, Canada.

A female specimen collected May 24, 1902, by Mr. G. Chagnon, and submitted by Mr. C. W. Johnson, of Boston, Mass., to whom it has been returned by request.

This European genus was founded by Hendel in the Kais. Konig. Zool-bot. Gesell. Wien, II., page 52, 1902, and besides the present form the *Dryomyza aristalis*, Coquillett, also belongs to this genus. The latter is closely related to *Dryomyza*, differing in the possession of a propleural bristle, a preapical pair of bristles on each front tibia, etc.

RECORDS OF AMERICAN BEES.

BY T. D. A. COCKERELL, COLORADO SPRINGS, COLO.

Chelostoma Neomexicanum, n. sp.

♀.—Length about 8 mm., black, with distinct narrow white hair-bands on abdomen. Middle of anterior margin of clypeus curved upwards, presenting a point from which the sides slope gently for some distance, and then abruptly nearly vertically, the whole, seen from beneath, having about the outline of a low house seen from one end; some distance on each side of this structure is a low projection of the margin. In general, the insect looks just like *Ashmeadiella bucconis*, but the second tooth of the mandibles is short, and the front and vertex are as densely punctured as it is possible for them to be. The last joint of the labial palpus is conspicuously longer than the penultimate one.

Hab.—Barela Mesa, New Mexico, at flowers of blue-bell; June 28, 1903. (*Anna Gohrman.*) The genus is new to New Mexico. The species will be easily known by the clypeal structure, as described. Miss Gohrman also collected *Osmia Bruneri*, Ckll., at flowers of blue-bell at Barela Mesa, June 28. The species is new to New Mexico. At the same place, and on the same day, she also collected *Anthidium maculosum*, Cr., ♂ (at loco flowers), and *Synhalonia frater*, Cr.

Halictus clematisellus, n. sp.

♀.—Length about 5 mm.; head and thorax olive green; abdomen shining bright orange-ferruginous, not at all dusky at apex, the third and fourth segments each with a small round black spot near the base on each extreme side; wings short, iridescent; tegulæ, nervures and stigma pale testaceous. In nearly all respects this agrees with *H. pictus*, Crawford, but it differs conspicuously in having the abdomen only very scantily pubescent, and the enclosure of the metathorax (except the broad shining rim) entirely covered with strong vermiform rugæ. The clypeus (except its upper margin) is wholly purplish-black, with very large, sparse punctures, and no testaceous border; the supraclypeal area is more or less brassy. The knees, apices of tibiæ, and tarsi more or less, are ferruginous. Antennæ black, flagellum dark brownish beneath. Mesothorax strongly and rather closely punctured on a microscopically tessellate surface. First abdominal segment smooth, with sparse, very minute punctures; second, with equally small but rather closer punctures, and more or less transversely striatulate basally. Hind spur of hind tibia with few, large teeth. Belongs to Robertson's group *Chloralictus*.

Hab.—Pecos, New Mexico, July 14, 1903. (*W. P. Cockerell.*) It occurs in numbers at flowers of *Clematis ligusticifolia*, but has been seen on no other plant.

Trypetes carinatum (Cresson).

Prof. C. H. T. Townsend has taken this at Tlacotalpam in Vera Cruz, Mexico, April 21. I cannot see any difference between the specimen and those found in the United States. The genus is new to Mexico.

Colletes Wilmattæ, n. sp.

♀.—Length 10 mm.; almost entirely covered with short pale yellow pubescence; legs red. Palpi ferruginous, with subequal joints, the basal ones a little the longer; malar space very short, at least twice as broad as long; mandibles black, with a faint red stain in the middle; labrum convex, shining, with a row of shallow pits; clypeus confluently punctured; antennæ short, black or nearly so, scape brownish, second joint very distinctly brown; prothoracic spines short; mesothorax shining and densely punctured, but the surface entirely concealed by the short hair; even the metathorax is covered with hair; tegulæ small, pale testaceous; wings very short, quite clear, the small stigma and the nervures pale ferruginous; second submarginal cell broader than high; abdomen rather parallel-sided, long, the dorsal surface entirely covered with very short pubescence, except the apical segment, which is dark brown and nearly bare, strongly contrasting.

Hab.—Pecos, N. M., Aug. 9, 1903. (*T. D. A. & W. P. Cockerell.*) Flying over damp ground by the Pecos River. A very distinct and beautiful species. The character of the pubescence allies it with *C. aberrans*, Ckll., while the red legs and some other characters curiously suggest the Brazilian *C. rufipes*, Smith. The insect also reminds one of *Dasiapis ochracea*, Ckll.

NOTES ON NORTH AMERICAN STRATIOMYIDÆ.

BY A. L. MELANDER, CHICAGO.

While arranging the flies of this family contained in the Garry de N. Hough collection of the University of Chicago, together with my own material, a number of notes have been made, which are here given. This family, like a number of other dipterous groups, needs monographic study owing to the confused and scattered descriptions of most of the forms. Of recent years the number of genera has been multiplied,

although the authors have neglected to sift out the older species belonging to these new groups. Accordingly, the older genera, like *Sargus* for example, contain species of several of the modern subdivisions.

In the following pages are listed the species studied, together with the localities from which they were received. Analytical keys are introduced for several of the genera as an aid to the future student. I here wish to thank my friend, Mr. Charles T. Brues, for supplying descriptions not accessible in this city.

ALLOGNOSTA.

Our three species are related thus :

Discal cell not as broad as the stigma ..... 2.

Discal cell as broad as the stigma ; abdomen testaceous centrally ..... *fuscitarsis*, Say.

2. Abdomen testaceous centrally ..... *similis*, Loew.

Abdomen wholly black ..... *obscuriventris*, Loew.

A. fuscitarsis, Say.

Edgebrook and Algonquin, Ill.; Kiamesha, N. Y. June.

A. obscuriventris, Loew.

Edgebrook, Ill. June. This species occurs in company with the preceding in open woodland.

BERIS.

But two species occur in the United States. They have the thorax metallic green and the abdomen black.

Scutellum with four spines ..... *viridis*, Say.

Scutellum with six or eight spines ..... *Mexicana*, Bell., Will.

B. viridis, Say.

New Jersey (vi., 3, '01) ; Michigan ; Glen Ellyn, Ill. (v., 30, '99).

B. Mexicana, Bellardi, Williston.

One specimen from Vancouver Island (Livingston, vii., 14, '96) agrees with Dr. Williston's redescription of this species (CAN. ENT., 1885, p. 123).

SARGUS.

The species grouped under the old genus *Sargus* are many of them superficially described. Accordingly, it would be difficult to decide to which subdivision most of the species belong. So far the species described under the generic name *Sargus* may be distributed among the following groups :

Non-metallic species ..... *Ptecticus*, Lw.*
More or less metallic species.
Eyes contiguous or subcontiguous, ♂ ; ocelli equidistant
Abdomen long, pedicellate, cylindrical at the base ..... *Macrosargus*, Bigot.
Abdomen short, broad and flattened..... .....Spp. *elegans*, Lw., and *Texana*, sp. n.
Eyes, ♂ ♀, separated ; front ocellus further from the other two..... *Sargus*, s. str.

The assignment of the species in the following table is based almost entirely on their descriptions, and hence can not be relied upon with absolute certainty. Many species are known from one sex alone, many are poorly described, and as we know that there is great variability in colour in some of the species, it seems certain that the species are less numerous than their descriptions. All the species that have been recorded as from North America are included in the table. To the future student who has a sufficiently large collection is left the task of solving the synonymy.

Abdomen petiolate ; eyes of male contiguous or nearly so ; ocelli equidistant (*Macrosargus*, Bigot)..... 2.
Abdomen not clavate ; eyes generally separated and front ocellus generally further from the others..... 11.

2. Thorax reddish, more or less metallic posteriorly ..... 3.
Thorax completely metallic green ..... 4.
3. Abdomen dark green ; antennæ black ..... *linearis*, Loew.
Abdomen reddish, with four black fasciæ..... *smaragdiferous*, Bigot.
4. Abdomen entirely metallic, cupreous..... 5.
Abdomen with the second segment yellow..... *coarctatus*, Macquart.
5. Scutellum margined with red; face more or less black pilose (*filiformis*, Gilio Tos)..... *cæsius*, Bellardi.
Scutellum wholly green or gold-green ..... 6.
6. Wings blackish ..... *clavatus*, Walker.
Wings at most brown..... 7.
7. Abdomen black with bronze lustre ..... *clavis*, Williston.
Abdomen cupreous with green lustre ..... .8.
Abdomen golden at base, aeneous at tip ..... *aureus*, Bellardi.

*(Of the species in Osten Sacken's Catalogue, *Sargus trivittatus*, Say, and *S. subinterruptus*, Bellardi, belong here.)

8. Pile black.....*alchidas*, Walker.
Pile fulvous .....9.
9. Mesonotum with a white spot...sp. innom., Osten Sacken, Williston.
Mesonotum not marked with a white spot .....10.
10. Pleura green; vertical triangle longer .....*lucens*, Loew.
Pleura yellow; vertical triangle shorter .....*lateralis*, Macquart.
11. Legs black, at least the hind femora more or less black ..... 26.
Legs largely yellow; at most the hind legs with brown markings..12.
12. Abdomen unicolored, not fasciate.....13.
Abdomen purple with yellow fasciæ.....25.
13. Abdomen reddish or yellowish, at least at base, sometimes with more or less cupreous tinge.....14.
Abdomen black, green, violet, or cupreous, not light coloured.. .17.
14. Pleura yellow, eyes of male contiguous.....*elegans*, Loew.
Pleura black or concolorous with the dorsum .....15.
15. Face and front reddish yellow ....16.
Face and front metallic green; wings hyaline; length 3 mm.....*bicolor*, Wiedemann.
16. Abdominal segments with lateral triangles; wings light brown (not *pallipes*, Say) .....*pallipes*, Bigot.
Abdomen aeneous at the tip; wings hyaline .....*debilis*, Walker.
17. Pleura yellow, wholly or partly.....18.
Pleura black or dark metallic ....20.
18. Legs varied with brown; stigma blackish.....19.
Legs completely yellow; stigma fuscous .....*pleuriticus*, Loew.
19. Thoxax blue-green; length 7 mm..... *cæruleifrons*, Johnson.
Thorax violet; length about 16 mm.....*splendens*, Bigot.
20. Front testaceous; scutellum margined with yellow .....21.
Front metallic, except sometimes for two white spots .....22.
21. Abdomen blue; veins yellow ... .*versicolor*, Bellardi.
Abdomen green; veins dark .....*bagosus*, Walker.
22. Face yellow; thorax violet.....*sapphireus*, Bigot.
Face black; thorax green.....23.
23. Eyes of male contiguous; ocelli equidistant; abdomen short and broad, green .....*Texanus*, sp. nov.
Normal *Sargus*-species; abdomen slender.....24.
24. *Sargus decorus*, Say.
abdomen green .....*punctifer*, Bigot.

abdomen cupreous. .....*picticornis*, Bigot.
xanthopus, Wiedemann.
abdomen piceous..... .....*decorus*, Say.
25. Hind legs varied with brown ..... *stamineus*, Fabricius.
Tip of hind tarsi only brown..... .....*tricolor*, Loew.
26. Thorax and abdomen violet green, concolorous.....27.
Thorax violet or green, abdomen not concolorous.....28.
Thorax red above, scutellum dark; abdomen yellow at base; fore legs pale .....*concinnus*, Osten Sacken.
27. Legs entirely black; antennæ black (*nigribarbis*, Bigot). *viridis*, Say.
Legs in part yellow; antennæ yellow.....*nigrifemoratus*, Macquart.
28. Wings with a brown cloud at middle (*nubeculosus*, Zetterstedt) .....*cuprarius*, Linnæus.
Wings uniformly yellowish; front legs pale.....29.
29. Abdomen uniformly metallic ....30.
Abdomen with a white vitta .....*Sallei*, Bellardi.
30. Abdomen cupreous violet.....*speciosus*, Macquart.
Abdomen aeneous .....*latus*, Bellardi.

Of these species the following are not listed in Osten Sacken's Catalogue:

splendens, Bigot, Ann. Soc. Ent. France (5), ix., p. 224. 1879. Mex.
nigribarbis, Bigot, ibid., p. 224. Cal. (=*viridis*, Say.)
clavis, Williston, CAN ENT., xvii., p. 123. 1885. Va., N. C.
punctifer, Bigot, Ann. Soc. Ent. France (6), vii., p. 27. 1887. Col.
picticornis, Bigot, ibid., p. 27. Wash.
pallipes. Bigot, ibid., p. 28, Oregon.
sapphireus, Bigot, ibid., p. 28, Cuba.
concinnus. Osten Sacken, Biologia Centr.-Amer. Dipt.
sp. innominata, Osten Sacken, ibid., p. 23. Mex.
Williston, ibid., Suppl., p. 231.
filiformis. Gilio Tos, Bull. Mus. Zool. Torin. 1891, No. 102. Mex. (=*cæsius*, Bell.)
sp. innominata, Townsend, Ann. N. Hist., xix., p. 18. 1897. Mex.
cæsius, Bellardi, Williston, Biol. Centr.-Amer. Dipt. Suppl., p. 232.
cæruleifrons, Johnson, Ent. News, Phila., xi., p. 325. New Jersey.
cuprarius, Linn, etc. A common European species.
coarctatus, Macq., etc. A Brazilian species, taken also in Mexico.
Texanus, sp., nov. Described herewith.

Notes on the distribution of the specimens of *Sargus* studied.

1. *lucens*, Loew. Several specimens from Hayti.

2. *cuprarius*, Linn. This is the species known as *nebeculosus*, Z ::., in collections. Not rare. Woods Hole, Mass. (July); Newark, N. J. (June); Penn.; Chicago, Ill. (June-July).
3. *decorus*, Say. Kiamesha, N. Y. (June); New Bedford, Mass. (May); Phila, Penn.; Ontario; Algonquin and Chicago, Ill.; Austin, Tex.; Vancouver Island. June and July.
4. *viridis*, Say. Mich.; London, Ontario; Chicago, Ill.; Denver, Col. May and June.
5. *elegans*, Loew. Opelousas, La. May and June.
6. *Texanus*, sp. nov.

Male: Eyes contiguous, subcontiguous in front of the antennæ; front and face black; antennæ reddish, the style black; proboscis yellow; ocelli equidistant, ocellar triangle metallic black, with fulvous pile. Thorax polished green, scutellum and metathorax somewhat more bluish; pile of thorax fulvous, erect, appearing dense when viewed from the side; humeri and a line to the root of the wing yellow; pleura black. Abdomen metallic green, with erect fulvous pile, sexual organs testaceous; venter piceous, becoming metallic posteriorly. Legs, including coxæ, completely yellow. Halteres yellow. Wings lutescent, veins yellow. Length, 6 mm.

Female: Front and vertex green, their sides parallel, medially bisected by a fine impressed line, which also separates the transversely innate frontal white spots. Between the antennæ and the frontal marks the ground colour is piceous. Otherwise as in the male.

Described from two males and one female collected by the writer at Austin, Texas, one bearing the date of April 28, 1900.

Although not a typical *Sargus*, this species is placed in this genus, as it is closely related to *elegans*, Loew. From *elegans* it may be distinguished by the shorter contiguity of the male eyes (in *elegans* the eyes are contiguous up to the ocellar triangle), by the lack of frontal spots in the male, the wholly green thorax and the black pleura.

PTECTICUS.

The two species occurring in the United States may be separated as follows:

Front black above; hind metatarsi black, remainder of hind tarsi white..... .....*Sackenii*, Williston.
Front wholly yellow; hind tarsi brown.....*trivittatus*, Say.

P. trivittatus, Say. (*P. similis*, Will.).

A single female from Pennsylvania.

HERMETIA.

1. *H. illucens*, Linn.

Not rare at Austin, Texas, during the whole year. The species seems to have a predilection for fences and sidewalks, where they can be picked up with the fingers, showing no desire for flight.

2. *H. aurata*, Bellardi.

Austin, Texas. April-May.

OXYCERA.

1. *O. maculata*, Oliv.

Opelousas, La. (May-June); Toronto, Ontario.

2. *O. unifasciata*, Loew.

Boykins, Va. (June); McHenry, Ill.

EUPARYPHUS.

E. tetraspilus, Loew.

McHenry, Ill. June.

NEMOTELUS.

The genus *Nemotelus* has been reviewed in the current number of Psyche, where five new species are described from my collection.

MYXOSARGUS.

M. fasciatus, Brauer.

Several specimens, all males, of this dainty little species were taken running about on the large leaves of Elephant's-ear growing along the Comal River, New Braunfels, Texas. May.

STRATIOMYIA.

Owing to the absence in Florida of Mr. C. W. Johnson at the time of publication, the analytical keys of *Odontomyia* and *Stratiomyia* in the Trans. Am. Ent. Soc. (1895) are full of typographical errors. Every student of this paper has been perplexed as to the meaning of the strange mélange. The following table is a transcription of the key published on page 230 of Mr. Johnson's paper:

Head ♂ ♀ narrower than the thorax.....2.
Head ♂ ♀ much wider than the thorax; third antennal joint flat ....17.
2. Eyes ♂ ♀ glabrous .....3.
Eyes ♂ pubescent.....16.
3. Occiput of both sexes largely yellow.....4.
Occiput black, sometimes yellow beneath.....8.
4. Antennæ normally long.....5.
Antennæ noticeably shorter than in the other species .....7.

5. Abdominal spots usually connected on the fourth segment of the male, and always connected on the fourth and usually on the third of the female ..... 6.
Abdominal spots never connected on the fourth segment of the ♂, and rarely connected in the ♀ ..... *barbata*, Loew.

6. Fifth segment with a large keystone-shaped marking. *melanostoma*, Lw.
Fifth segment with a dorsal line and spot at the anterior angle ..... *lativentris*, Lw.

7. Abdomen: lateral triangular markings on the second and third segments, widely connected on the lateral margin... *Bruneri*, Johns.
Abdomen: lateral subtriangular markings on the second and third segments not connected at the lateral margins ..... *laticeps*, Lw.

8. Scutellum normally yellow, or with base narrowly black..... 9.
Scutellum black, or with narrow apical margin yellow..... 12.

9. Second segment with lateral triangles; wings infumated ..... 10.
Second segment with narrow lateral markings; wings usually dark ..... *senaria*, Lw.

10. Posterior margin of fourth segment yellow, with median triangular projection..... *unilimbata*, Lw.
Yellow on posterior margin of fourth segment interrupted..... 11.

11. Fourth segment with a small dorsal triangle; vertex of ♀ black..... *normula*, Lw.
Fourth and fifth segments with small dorsal triangles; vertex of ♀ usually yellow... ..... *norma*, Wied.

12. Abdomen with yellow markings..... 13.
Abdomen wholly black ♂ (♀ unknown) ..... *Nevadæ*, Big.

13. Abdominal markings linear..... 14.
Abdominal markings coalesced, forming a triangular yellow spot at the anterior corners of the abdomen ..... 15.

14. Fifth segment with a dorsal line; lateral markings on the segments of the ♀ very narrow..... *Meigenii*, Wied.
Fifth segment with a dorsal triangle; lateral markings on the segments of the ♂ ♀ prominent ..... *apicula*, Lw.

15. Pile of the thorax unusually long and dense; abdomen wide, third and fourth segments very convex..... *discalis*, Lw.
Pile on the thorax normal; abdomen narrow, and third and fourth segments noticeably convex ..... *quaternaria*, Lw.

16. Face of ♀ yellow, ♂ black; abdomen with a wide maculated or indented lateral margin; variable.....*maculosa*, Lw.
Face of ♂ ♀ yellow, with a longitudinal line of black; abdominal markings transverse, the same in both sexes; eyes of ♀ glabrous.....*badius*, Walker.

17. Abdomen: bands on the second segment interrupted, the third and fourth contiguous.....18.
Abdomen: fourth and fifth segments only with wide yellow bands.....*mutabilis*, Fabr.

18. Scutellum ♂ black.....19.
Scutellum ♂ ♀ yellow.....*constans*, Lw.

19. Abdomen: bands on the second and third segments contiguous.....*Gerstæckeri*, Bell.
Abdomen: second segment with two large spots...*bimaculata*, Bell.

List of species of *Stratiomyia* studied.

1. *S. melanostoma*, Lw.
McHenry, Ill. July.

2. *S. lativentris*, Loew.
Chicago, Ill. (July); Canada.

3. *S. normula*, Loew.
Chicago, Ill. (May); Colorado.

4. *S. norma*, Wiedemann.
Indiana; McHenry, Ill. (June).

5. *S. unilimbata*, Loew.
McHenry, Ill. (July); Milwaukee, Wisc. (June); Berkeley, Col. (May).

6. *S. Meigenii*, Wiedemann.
Chicago, Ill.; Austin, Texas; S. Dakota.

7. *S. apicula*, Loew.
Algonquin, Ill. (June); Austin, Texas (April).

8. *S. discalis*, Loew.
Chicago, Ill. May.

9. *S. badius*, Walker.
McHenry, Ill. June and July.

10. *S. constans*, Loew.
Austin, Texas. April to October. Common.

ODONTOMYIA.

The puzzling key to the species of *Odontomyia*, given in the Transactions of the American Entomological Society, 1895, pp. 250–251, was printed without Mr. Johnson's supervision, and contains numerous mistakes in typography. The student attempting to use the key is misled to a blind ending in four places. The dichotomy is given corrected herewith. In addition to the species listed by Mr. Johnson, the Supplement of the Biologia Centrali-Americana contains three recent species from Mexico.

Third longitudinal vein branched ..... 2.
Third longitudinal vein simple ..... 13.

2. Abdomen largely green or yellow ..... 3.
   Abdomen largely black, the markings comparatively narrow ..... 10.
3. Sides of dorsulum of thorax yellow or green ..... 4.
   Dorsum of thorax wholly black ..... 8.
4. Abdominal markings ♂ ♀ dissimilar; markings of ♂ confluent laterally ..... 5.
   Abdominal markings ♂ ♀ similar, separated ..... 7.
5. Disc of thorax usually with two irregular marks ..... *binotata*, Lw.
   Disc of thorax without marks ..... 6.
6. Spines of scutellum blunt ..... *varipes*, Lw.
   Spines of scutellum sharp ..... *viridis*, Bell.
7. Abdominal markings triangular, attenuated and reaching the lateral margins ..... *cincta*, Oliv.
   Abdominal markings triangular, not reaching the lateral margins ..... *dorsalis*, Fabr.
8. Abdomen ♀ with transverse bands; ♂ with only lateral markings at posterior angles ..... *inæqualis*, Lw.
   Abdomen ♀ with transverse bands; male with dorsal line ..... 9.
   Abdomen ♂ ♀ similar, with basal triangular spot and transverse bands ..... *rufipes*, Lw.
9. Scutellum and spines yellow ..... *arcuata*, Lw.
   Scutellum and spines black ..... *flava*, Say.
10. Scutellum more or less yellowish, without spines ..... 11.
    Scutellum black, with spines ..... 12.
11. Scutellum wholly black; black of the vertex does not extend over the vertical angle ..... *fallax*, Johns.
    Scutellum, base black; black of the vertex extends over the vertical angle: proboscis longer ..... *nigrirostris*, Lw.

12. Wings: very dark brown, face produced ..... *nigerrima*, Lw.
Wings: veins reddish, face rounded, front broad ..... *pilosus*, Day.
13. First antennal joint less than twice the length of the second ..... 14.
First antennal joint twice the length of the third or longer ..... 24.
14. Scutellum largely yellowish ..... 15.
Scutellum black or marked with yellow ..... 18.
15. Pleura ♂ yellow; thorax ♀ with yellow vittæ .... *trivittata*, Say.
Pleura ♂ black; thorax ♀ not vittate ..... 16.
16. Abdomen wholly green ..... *Aldrichii*, Johns.
Abdomen with black marks ..... 17.
17. Antennæ, front and vertex red ..... *hydroleonoides*, Johns.
Antennæ, front and vertex black ..... *vertebrata*, Say.
18. Scutellum laterally green ..... *Texasiana*, Johns.
Scutellum apically green ..... 19.
19. Abdomen ♂ ♀ with wide dorsal line, usually narrower in ♂ than in ♀ ..... 20.
Abdomen ♀ black with transverse markings, ♂ with dorsal line ..... *interrupta*, Oliv.
Abdomen ♂ ♀ with transverse or triangular markings ..... 23.
20. Third antennal joint sharply pointed; front yellow ..... 21.
Third antennal joint bluntly pointed; front shining black ..... 22.
21. Abdomen brown-black, with wide continuous lateral margin; scutellum ♀ yellow ..... *microstoma*, Lw.
Abdomen with irregular median black stripe ..... *pilimana*, Lw.
22. Pile of thorax whitish; median black stripe of abdomen straight ..... *Americana*, Day.
Pile of thorax yellow; median black stripe notched on the sides ..... *virgo*, Wied.
23. Femora yellow; abdominal marks usually triangular .. *pubescens*, Day.
Femora black; abdominal marks transverse ..... *hoodiana*, Big.
24. First and second joints of the antennæ black ..... 25.
First and second joints red ..... 26.
25. Front and vertex wide, lateral thoracic stripe continuous ..... *hieroglyphica*, Oliv.
Front and vertex narrow; lateral thoracic stripe abbreviated anteriorly ..... *similis*, Johns.
26. Eyes pubescent; scutellum of ♀ yellow ..... 27.
Eyes glabrous; scutellum black, with yellow margin. *occipitalis*, Johns.
27. Abdomen ♂ broad, with narrow markings, pilose ..... *obscura*, Oliv.
Abdomen ♂ narrow, with wide markings, pubescent. *flavicornis*, Oliv.

(To be continued.)

BOOK NOTICES.

THE MOTH BOOK.—A popular guide to a knowledge of the Moths of North America. By W. J. Holland, D.D., Director of the Carnegie Museum, Pittsburg, Pa., etc. New York : Doubleday, Page & Company, 34 Union Square ; 4to. pp. xxiv. + 479. (Price $4.00 net, postage 34 cents.)

It is now four years since Dr. Holland published his admirable "Butterfly Book," and for some time the possessors of it have been looking forward eagerly to the publication of this companion volume, which is intended to afford an easy introduction to the identification of our moths. We can well understand that the task has been a difficult one, as there are six thousand species listed, a number manifestly impossible to figure or describe in a single volume, and the problem has been how to make a satisfactory selection from this vast number. The author has wisely solved the difficulty by figuring almost all the larger and more conspicuous species which the ordinary collector is most likely to meet with, and giving representatives of many genera in the remaining families. Owing to the limitations of space, no descriptions are given as a rule, but there is a useful key to the families, and a list of books which the student may consult.

The forty-eight plates, containing over 1,500 figures, are very beautiful, and for the most part true to nature, but in some cases the purple tint of the background affects the correctness of the colouring. In many instances the effect is marvellously successful, as may be seen in the case of *Composia fidelissima* (plate xxxviii., fig. 4), and the figures of larvæ on the frontispiece. The cuts in the text, 263 in number, are not so satisfactory, owing to the rough texture of the paper, which has prevented clear impressions from being made.

A full meed of gratitude is certainly due to Dr. Holland for this welcome addition to the goodly list of popular works on Natural History. With this volume, the Butterfly Book, and Dr. Howard's Insect Book, the way is made easy for beginners in the study of Entomology, who should now become many times more numerous than ever before. The initial difficulties regarding the identification of specimens being largely removed, collectors and students should have much more time at their disposal for tracing out the life-histories and observing the manners and customs of insects respecting which we know little at present.

The want of a "Beetle Book" still remains unfulfilled. Its preparation would be an even more difficult task than that of the "Moth Book," owing to the immense number of species to be dealt with, and the minute size of a large proportion of them; it might, however, be practicable to take up a certain number of families at a time and spread the work over two or more volumes.—C. J. S. B.

We have before us Dr. Holland's long expected "Moth Book," a companion to his well-known "Butterfly Book," published in the same style and only a little larger. The coloured plates show most characteristically the appearance of all the commoner North American moths, except in the lower families, where only typical illustrations are given. The book will be of great value to all collectors. Not only this, but there are several features wherein it will commend itself to more advanced students. Several types are figured, noticeably some of Hulst in the Geometridæ, and among these I see some species with the appearance of which I was not hitherto familiar. A few new species are described by Dr. Holland, and there is some change in the nomenclature, notably the adoption of the names of the Sphingidæ proposed by Rothschild and Jordan. There is no attempt at description of genera or species, and the synoptic tables do not proceed beyond family definition; but a good review of the literature of the subject is given, arranged under a heading of families. We are personally aware that Dr. Holland took much pains to avoid misidentification of his figures, but are sorry to note that a considerable number have nevertheless crept in. A casual glance over the plates shows, for example, pl. xxix., fig. 66, what purports to be *Cydosia majuscula*, Hy. Edw., but really represents *Tricostibas calligera*, Zell. Pl. xlii., fig. 32, is labelled *Tephroclystis absinthiata*, Cl., but shows *Macaria infimata*, Guen.; pl. xliii., figs. 10 and 11, are marked *Hydriomene custodiata*, Guen., but really represent *Hydriomene excurvata*, Grt. On page 378 in the text is figured "*Inguromorpha basalis*," which should be *Cossula magnifica*, while the cut on page 379, which purports to be the latter species, is a representation of something unfamiliar to me, which is neither *magnifica* nor *basalis*. The plate xlvii., representing Limacodiæ, contains several errors: fig. 15 should be *Euclea indeterminata*, not *E. chloris;* fig. 21 should be *Tortricidia flexuosa*, not *Cochlidion y-inversa*, and fig. 27 should be *Cochlidion latomia*, not *C. rectilinea*, which has black hind wings. We fear that there are other such misidentifications, and on this point the student will have to be on his guard in using the book. HARRISON G. DYAR.

CATALOGUE OF THE LEPIDOPTERA PHALÆNÆ IN THE BRITISH MUSEUM, Vol iv. By Sir George F. Hampson, Bart. London: 1903; xx + 689 pages, with a supplementary volume of coloured plates.

With this volume the Noctuidæ are begun, the classification to be used is outlined, and about one-tenth of the species are treated. Fifteen subfamilies are recognized, based on the usual structural characters, but used in a new order, and a very commendable one it seems to us. The first subfamily, the one treated in this volume, is the Agrotinæ, containing all those Noctuids with trifid venation of the hind wings and spines on the hind tibiæ. This subfamily is remarkably well represented in North America, so that the volume consists largely of our familiar names—I ought to say our familiar species, for the names are very largely changed. The sequence of genera, too, is a new one. The little day-flying *Heliolonche modicella* heads our list, followed by the Heliothids and Schinias, and finally the bulk of the Agrotids proper. These changes in the generic names were fully to be expected, since now for the first time all the old names are applied to the world fauna. Besides this, secondary sexual characters are not used in generic definition, and this naturally makes a great change in the names as heretofore applied by American authors. We have been in the habit of using these characters very largely. I am therefore pleased to note that there are some of our names that are not changed. I regret that Hübner's "Tentamen" is not adopted. American economic students will hardly recognize the familiar Boll-worm under the new appellation of *Chloridea obscura*, Fab. A part of this change could have been avoided by recognizing the Tentamen; it would have allowed the retention of the generic name *Heliothis*. Our large genus *Carneades* (*Paragrotis*, Pratt, of Bull. 52, U. S. Nat. Mus.), made still larger by the addition of *Rhizagrotis* and *Corhizagrotis*, is called *Euxoa*, Hübn. It would be *Agrotis* if the Tentamen names were applied. The term *Noctua*, Linn., does not appear in the volume, being applied to the South American species *strix*. The process of arriving at this and other types of genera is not elucidated, and it is not clear to us. We can only hope that future workers will not feel obliged to review the matter, and change all the names again.

A few new genera are based on our species, and two new North American species are described. Most ill-advisedly, the name *Californica* has been selected for one of these. This specific name has been used

already too often, so that it has become a nuisance to anyone attempting to use a specific index. There are thirty species named *Californica*, and including the variants *Californiæ*, *Californiata*, *Californiella*, *Californiana* and *Californicalis*, the name has been used forty-eight times. The other new name, *borealis*, is also objectionable, having been used no less than sixteen times for North American species.

We note that Harvey's species are uniformly credited to Harris.

At the end of the book is a list of 77 unrecognized species, 26 of which are North American, and might have been eliminated from the list if American students had exerted themselves more actively to assist the author. HARRISON G. DYAR.

PERSONAL NOTES.

From *Science* we learn that the following Entomological appointments have been recently made:

MR. S. I. KUWANA, M. S. (Leland-Stanford University), has been appointed Entomologist at the Central Agricultural Experimental Station, Nishigahara, Tokyo, Japan. His special studies have been devoted to scale insects, and he has monographed the Japanese Coccidæ, so far as the species are at present known.

PROF. C. P. GILLETTE, Entomologist at the Agricultural College, Fort Collins, Colorado, has been appointed Chief Entomologist of the St. Louis Exposition.

MR. H. MAXWELL-LEFROY, who left Barbadoes early in the year to fill the the position of Entomologist to the Government of India at the Imperial School of Forestry, Dehra Dun, N. W. Provinces, is to be stationed at Surat in the Bombay Presidency.

PROF. W. M. SCOTT, State Entomologist and Pathologist of Georgia, has been appointed Pathologist in the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C.

PROF. WILMON NEWELL, of the Texas Agricultural College, has been appointed State Entomologist of Georgia, *vice* Prof. Scott.

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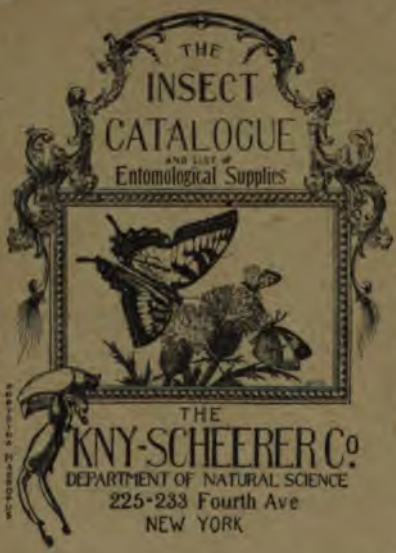

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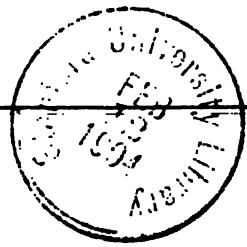

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REV. C. J. S. BETHUNE,

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WANTED. North American *Hemiptera*, eastern and southern species (many of the commonest). Offered: Lepidoptera, Coleoptera and Hemiptera, named, from British Columbia. GEO. W. TAYLOR, Wellington, B. C.

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The Canadian Entomologist.

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NEW NOCTUIDÆ FROM BRITISH COLUMBIA.

BY HARRISON G. DYAR, U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

Apatela mœsta, n. var.

A very distinct form of the European *leporina*, Linn.; dark gray, fully as dark as *Canadensis*, Smith & Dyar, which it much resembles; but the basal line is broken and the transverse posterior line is dentate as in *leporina*.

Described from 6 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7322.

Apatela griseor, n. var.

A western variety of *innotata*, Guen., slightly larger, the white ground colour more distinctly strewn with black scales and the black marks bordering the usual lines sharper and more pronounced, especially noticeable in the transverse anterior line. In *innotata* this line is almost lost; in *griseor* it is often nearly as obvious as the transverse posterior line.

Described from 16 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7323.

Apatela dolorosa, n. var.

A western form of *distans*, Grote; darker than its eastern ally, both in the tone of the gray ground and the amount of black shadings. It closely resembles *emaculata*, Smith, from the same region, but is a less smoothly gray and has more marked contrasts between the light and dark shades; the transverse posterior line is more distinctly dentate, and there are other slight differences, so that I think we have to do with distinct, although closely allied species.

Described from 3 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7324.

Platyperigea anotha, n. sp.

Luteous, strewn with dark scales. Head and palpi black-brown, thorax and abdomen luteous grayish. Fore wings shining luteous, basal line rather distinct, broken, the costal half supplemented by an outwardly placed shade on inner margin; t.-a. line distinct, single, brown-black,

marked by a spot on costa, with an outward subcostal angle and an inward one on vein 1. Orbicular round, small, black; reniform a large, diffuse, black cloud. Median shade close to t.-p. line, broad, diffuse, obsolete above. T.-p. line crenulate, inflexed at costa to a spot above reniform and bent inward below cell evenly. A light space beyond it is succeeded by a broad smoky marginal shade, which a faint, pale, subterminal line bisects. The shade is gathered to an ill-defined dark patch on anal angle. Hind wings whitish at base, brownish outwardly, subpellucid. Expanse 20 mm. The wings are not very broad.

Described from one specimen, ♂, Revelstoke, B. C.

U. S. National Museum, type No. 7325.

Caradrina nitens, n. sp.

Large, slender, close to *miranda*, Grote, but much blacker. Head and thorax black, not lighter in front; fore wings shining brown-black, orbicular a black dot, reniform a white lunate spot preceded by a black dot; other marks lost, the lines barely traceable in the best specimen. Hind wings silky whitish, smoky along costa and outer edge. Expanse 30 mm.

Described from 8 specimens, Kaslo, B. C., and Turtle Mts., North Dakota (A. H. Verrill).

U. S. National Museum, type No. 7336.

Hadena maida, n. sp.

Close to *dubitans*, Walk., in appearance. Thorax and fore wings of the same blackish brown as in the darkest *dubitans*, but more smooth and shining and the wings somewhat narrower; a light brown area at centre of inner margin. Lines lost; t.-p. line indicated by fine white venular dots, s.-t. by a white powdering preceded by black, which forms a rather distinct spot at anal angle. Fringe crenulate, containing white specks at the ends of the veins. Orbicular a linear black ellipse, broken above; claviform similarly distinctly outlined in black, the filling as dark as the ground colour; reniform black edged except superiorly, with a double curved white mark outwardly. A few white specks on costal edge. Hind wings gray, irregularly shaded. Fringe, abdomen and whole under surface suffused with pinkish purple. Expanse 36 to 40 mm.

Described from 9 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7326.

Homohadena fifia, n. var.

Differs from *badistriga*, Grote, in being darker gray, the ground

colour ashen, obscured by dark shades, without any of the testaceous tint of its eastern ally. The collar is gray, scarcely contrasting with the thorax. The markings are as in *badistriga*, and vary much in the extent of the black shades.

Described from 2 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7337.

Homohedena Cocklei, n. sp.

Brownish black, some of the scales hoary tipped. Fore wings dark, basal space dark gray, median space black, a little lighter than the limiting t.-a. and t.-p. lines, which are single, the t.-a. line with three slight waves, the t.-p. bent out over reniform, Stigmata obsolete, orbicular barely indicated, reniform a lighter shade. S.-t. space pale, the veins a little darker. S.-t. line a diffuse black shade, grayish outwardly on its lower half, this colour forming an ill-defined spot at anal angle; fringes dark. Hind wing solidly black, fringe white. Below black, a faint white discal dot on fore wings and a distinct lunate one on hind wings. Fringes as above. Expanse 27 mm.

Described from one specimen, ♂, Ainsworth, B. C.

Rhynchagrotis scopeops, n. sp.

Allied to *variata* and *alternata*. Dark violaceous brown, shading to dull clay colour at bases of wings and on thorax. Lines geminate, crenulate, as in *alternata*, but distinct; orbicular and reniform distinctly bordered with whitish rings, filled with the ground colour. Terminal space bluish ashen, contrasted; margin narrowly and fringe dark.

Described from 6 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7327.

Peridroma subjugata, n. var.

Differs from *astricta*, Morr., in being uniformly darker, the brown colour more or less reduced, visible only for a short space inside the t.-p. line, never wholly absent, though sometimes very nearly so. Discal spots much grayer, almost white at the edges, darker filled. Terminal space sparsely gray powdered. The discal spots are sometimes joined by a spur from the reniform along the median vein. The form stands between *astricta*, Morr., and *nigra*, Smith, but does not connect them.

Described from 61 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7328.

Noctua umbrosa, n. var.

Judging by the ♂ genitalia, which agree with Smith's figure, this is

a form of *cynica*, Smith, rather than of *rubifera*, Grote. The markings are the same, but the colour is much darker, a grayish brown, giving a very distinct appearance.

Described from 117 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7329.

Mamestra crydina, n. var.

A racial form between *purpurissata*, Grt., and *juncimacula*, Smith. Darkly coloured and variable; some of the specimens are nearly indistinguishable from the Eastern *purpurissata*, though in most the t.-p. line is more or less distinct, sometimes very distinct, scalloped, black, pale edged outwardly. The reniform frequently has a spur below, sometimes joining the spots as in *juncimacula*, Smith.

Described from 21 specimens, Kaslo, B. C.

U. S. National Museum, type No. 7330.

Himella infidelis, n. sp.

Between *contrahens*, Walk., and *conar*, Streck., with the discal spots of the latter and the diversified ground colour of the former. Fore wing light brown, nearly ochreous, shaded with dark except along internal margin and beyond reniform. Lines black, t.-a. scalloped, t.-p. bent outward beyond reniform. Spots black, distinct, white ringed, orbicular small, reniform constricted with a slight spur below. Fringe dark, spotted with ochreous; thorax reddish.

Described from 5 specimens, Kaslo, B. C., and Turtle Mts., N. Dakota (A. H. Verrill).

U. S. National Museum, type No. 7331.

Tæniocampa communis, n. sp.

Thoracic vestiture hairy, without scales; ♂ antennæ simple. Luteous, powdered with blackish scales. Lines geminate, blackish, interrupted; basal half line indistinct, t.-a. waved, t.-p. bent outward over reniform, s.t. concolorous or a little paler, preceded by a dusky shade, often as distinct as the other lines. Stigmata concolorous or more or less dark filled, pale ringed. A row of terminal dark dots; fringe dusky. Hind wings luteous, fuscous shaded. Expanse 26 to 32 mm.

Described from 3,500 specimens, 3,495 of which are from Kaslo, B. C.; the other 5 from California and Colorado, without definite localities.

U. S. National Museum, type No. 7332.

Perigrapha achsha, n. sp.

Thorax robust, hairy, forming a slight anterior crest. Wings broad,

the apex of primaries acute, outer margin rounded, costa straight. Abdomen without dorsal tufts. Thorax dark mouse gray, collar lighter at the sides, no markings. Abdomen brownish gray. Fore wings bluish ash-gray sprinkled with dark mouse gray, forming nearly a solid area on the lower half of the median space and less solidly on lower half of basal space; costa and fringe dark. Lines obsolete, indicated by the limits of the darkened median space, appearing pale by the remnants of the pale filling of geminate lines. Terminal half of wing broadly of the pale bluish ash ground colour, not discolorously paler, but lacking the dark shadings. A double row of black venular dots, situated apparently between the positions of the obsolete t.-a. and s.-t. lines. Between the pairs of these dots the colour is faintly lighter, indicating whitish spots. Orbicular and reniform irregularly outlined in black, filled with a slightly darker shade, inconspicuous, moderate, well separated, upright; claviform lost. The colour on the lower half of the wing is a little darkened on the veins. Hind wings pinkish brown, darkened and smoky on the outer half. Below, the fore wings are pinkish along the costa, else smoky brown, a diffuse discal spot and outer line of blackish. Hind wings all pinkish, irrorate with darker, an outer row of venular spots. Expanse 38 mm.

Described from 1 specimen, ♂, Kaslo, B. C.

THE ORDER DIPTERA.

Diptera during the past century have gradually risen in public estimation, especially among men of science. The superiority of their organization has been recognized by systematists, and observers of living specimens have noticed peculiarities in their behaviour which prove a higher development of their faculties than of those of other orders.

Diptera, more than all other insects, show a distinct love of *freedom*, while Hymenoptera, with all their perfections, betray *drill*. Owing to their organization, Diptera have more control over their motions than any other insects, in consequence of which there is a remarkable stamp of *individuality* in their actions. They can suddenly arrest their flight, and poise in the air; they can not only swarm, but *dance* in cadence, or gambol in the air in the most extraordinary manner. It is principally the males who dance, play and frolic together; during courtship they perform most ludicrous antics. Schiller said: "The animal, the child, as well as man, *play*; the sense of strength and the higher sense of freedom derived from strength give rise to the joy of playing."—OSTEN SACKEN.

THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

St. Louis, Mo., Dec. 30 and 31, 1903.

One of the most enjoyable features of the St. Louis meeting of the A. A. A. S., from the entomologists' standpoint, was the informal sessions of the Entomological Club, held at the Southern Hotel on the evenings of Dec. 30–31. The duties of chairman were discharged by Dr. Jas. Fletcher in his inimitably felicitous manner, the proceedings being recorded by Messrs. Kirkland and Wilcox. Among those present were: Messrs. Howard, Marlatt, Lochhead, Corbett, Clifton, Symons, Cooley, Frost, Adams, Sanderson, Fairchild, Burgess, Fletcher, Gillette, Felt, Knab, Kirkland and others.

Mr. Marlatt gave a description of a recent trip in California, and described in detail the work of the introduced parasite, *Scutellista cyanea*, on the black scale (*Lecanium oleæ*). This insect has become well established in Californian orchards, and now practically controls the black scale. It will probably prove as valuable an ally of the fruit-grower as has *Vedalia cardinalis* in the case of the white scale (*Icerya purchasi*).

The black scale is a general feeder, breeding on orange, pepper-tree, erigeron, cockle-burr, sunflower, Chili pepper, etc. It results that these food plants keep up the stock of scale in which the *Scutellista* breeds, and it in turn attacks the scale in the orchards. So valuable has the *Scutellista* proved, and so general is the appreciation of its services, that it is not unusual for orchardists suffering from the scale attack to surreptitiously remove infested scales from the orchards of their more fortunate neighbors and thus colonize the parasite among their own trees.

Dr. Howard discussed the first importation of *Scutellista* to Baton Rouge, La., several years ago, to which place he sent the parasite, hoping it would prove effective against certain *Ceroplastes* common there. This introduction, according to Prof. Morgan, was a failure. When Lounsbury bred the *Scutellista* on the black scale in S. Africa, Dr. Howard at once arranged for an importation of the parasite to California, where, through the work of the agents of the Department of Agriculture, and Mr. Craw, the insect has now become well established, with results as previously described by Mr. Marlatt.

The *Scutellista* was probably sent to South Africa originally on plants from English colonists at Ceylon, where it is a native species. It is the first known *Chalcid* that destroys *all* the eggs of its host. In the case of

Aphelinus mytilaspidis, which breeds in the common oyster-shell and scurfy bark lice, at least 10 or 15 eggs remain under the scale unharmed after the parasite has ceased feeding, as determined by actual count.

Dr. Howard also called attention to the improved status in public opinion now enjoyed by the pepper-tree in Southern California. Heretofore this common tree has been under a ban because of harbouring the black scale. Now it is regarded in a better light, because, while breeding the scale, it also serves as a constant source of supply of the highly-prized *Scutellista*.

Mr. Symons described the serious injury caused by the cigarette beetle in the tobacco warehouses and factories of Maryland. This insect has increased to such an extent as to render a law for compulsory fumigation advisable. *Diatrea saccharalis* appeared in notable numbers in Maryland this year.

Dr. Howard stated that this borer breeds in sugar-cane, sorghum, rank grasses, etc., as well as in corn, and was probably introduced here in sugar-cane.

Mr. Cooley described the rich entomological fauna of Montana, and spoke with enthusiasm of the field there offered to the collector. Among the interesting specimens he had recently taken was a small *Buprestid*, which flew freely, in spite of the fact that its elytra were closely fused together.

Mr. Adams expressed in fitting phrase what all had felt, the delightful spirit of good-fellowship that characterized such meetings of the entomological fraternity. Various experiences on collecting trips in Arizona were described in a pleasing manner, and certain interesting finds of *Trypetidæ* described.

Mr. Frost described the successful fumigation of a tomato house infested with *Aleyrodes*. Cyanide at the rate of ¾ ounce to 2,000 cubic feet, 3 hours' night exposure was completely successful in destroying the insects without damage to the plants. In another house 4-5 oz. cyanide to 2,000 cubic feet, all night exposure, resulted in slight, but not serious, injury to the plants.

Mr. Kirkland described the increase of the Gypsy moth in Mass. now that the State has abandoned its warfare against the pest, and stated that the Brown-tail moth has become well established in the oak woodlands of Eastern Mass., which thereby become a constant source of infestation,

He recorded the breeding of very large numbers of *Diglochis omnivorus* from pupæ of the latter moth.

Dr. Howard expressed the opinion that these parasites were secondary, and that the primary parasite was probably a *Pimpla*.

Mr. Lochhead described in a most interesting manner a collecting trip into the Abbitibi region, where remote from all cultivated areas large numbers of *Pieris rapæ* imagoes were taken.

Mr. Corbett has recently devoted considerable attention to spraying outfits, and has succeeded in perfecting a duplex nozzle for applying the mechanical mixture of kerosene and water. He hoped in time to devise some form of compressed air outfit which should prove satisfactory in applying this and other sprays.

The best of the "wine" came at the "last of the feast." Although the hour was late, no feature of the meeting was more enjoyed than the remarks of Dr. Fletcher, who vividly described a long collecting and lecturing tour made through the west of the Canadian Dominion last summer. The breeding of certain Trypetas in Canada thistle, with their parasite *Solenotus*, and another in sunflower stems, were described, together with an interesting outbreak of *Loxostege sticticalis* in Manitoba and the N.-W. Territories. Here the insects, after devouring their chosen food-plant, *Chenopodium*, attacked various other forms of herbage, and even, rarely, wheat plants. The marching of the larval swarms in June and September attracted much attention and aroused unnecessary alarm. An experiment with the South African fungus *vs.* locusts in Manitoba was unsuccessful. Dr. Fletcher has this year succeeded in procuring eggs and breeding certain rare lepidoptera, viz.: *Leucobrephos Middendorffii* and *Apocheima rachelæ*, and has now the life-history of these two species worked out in full.

In closing, Dr. Fletcher spoke feelingly of the assistance he and other Canadian Entomologists had constantly received from his confreres on the other side of the line, particularly from Messrs. Howard and Marlatt, while the sentiment of his audience was that the acquaintance and friendship of workers like Messrs. Fletcher, Bethune, Lochhead and others on the Canadian side was sufficient reason to make all desire the immediate annexation of the Dominion.

The meeting adjourned to meet again the following evening.

A. H. KIRKLAND, Secretary.

SYNOPSIS OF ANTHOPHILA.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

This is one of a series of papers—Andreninæ, Tr. Am. Ent., Soc. 28: 187; Halictinæ, CAN. ENT. 34: 245, 1902; Sphecodinæ, Ent. News 14: 103; Megachilidæ and Bombinæ, Tr. Am. Ent. Soc. 29: 163; Nomadinæ, CAN. ENT. 35: 172; Epeolinæ, CAN. ENT. 35: 284, 1903—intended to bring together the results of studies of the bees of the neighbourhood of Carlinville, Illinois.

The synopses are intended primarily to enable the student to distinguish the local species, and are based exclusively upon them, so that the characters assigned may not always be true of related things from beyond the district. In a given category I may mention certain characters which are common to all of the local representatives of a group, and may not mention those characters in the alternate category. Thus I say the Andrenidæ have the mandibles bidentate, not mentioning them in Halictidæ because they are various.

When a family, or superfamily, is named from a given genus, I hold that genus is the type of the family, and fixes the application of the family name as the one to which that genus belongs. The name Apidæ has been used in three senses, and I use it in a fourth, but Apis always belongs to it.

The group of Apygidialia is placed first because it contains the lowest bees. It appears to be an older, more broken series, there being wide gaps between the different subdivisions.

In the superfamily Trypetoidea, Stelididæ is defined to contain Trachusa, and no doubt Zacesta, in subfamily Trachusinæ, and Anthidiinæ as a second subfamily, with the tribes Anthidiini and Stelidini. The basal tooth of the claws of certain Megachilinæ is not homologous with the inner tooth of Trachusa and Anthidiinæ.

In Ceratinoidea I would include Exoneura in a separate family, Exoneuridæ. I have seen *E. libanensis*, Friese. The most remarkable thing about the case of this insect is that any one should regard it as an inquiline. Allopade is evidently related here. There still remains a wide gap between these things and Xylocopidæ.

I would not separate Bombus and Psithyrus from Apidæ. It seems that a similar treatment would result in endless families. Psithyridæ is a relic of Schmiedeknecht's third section. Since he referred the inquilines to this third section, which had the rank of a superfamily, he was obliged to

erect a separate family for it. If this third section is rejected, there is no ground for the retention of Psithyridæ. The family Stelididæ of Schmiedeknecht is in the same case.

The presence of a distinct malar space is a common thing in the Apygidialia, occurring in all of the principal groups. It is rare in the Pygidialia.

The Pygidialia form a more recent, continuous series. I would separate the Halictidæ from the Andrenidæ on account of their structural differences, their different flight, and the fact that they have produced their own inquilines. The structural characters of Paranomia, etc., seem to justify their separation as a family. Macropis is separated in the same way. I do not think it is closely related either to Panurgidæ or to Melitta. Halictoides is referred to Dufoureidæ. This family differs from Panurgidæ by the cell III_{1+2} being pointed on costa; the mandibles bidentate; labrum without basal space or process; the scopa femorilegid, the females collecting loose pollen; the face without coloured marks and without foveæ. Both families show considerable variation in the structure of the mouth-parts. Indeed, Rhophites, in Dufoureidæ, has the labial palpi more highly specialized than in any other bee I have seen, joints 1-3 being flattened and 4 being simple and lateral. Protandrena I would refer to Protandreninæ, a sub-family of Panurgidæ. Panurgus is one of the exceptions among the Andrenoidea in having crurilegid scopæ and collecting loose pollen. The scopa is consequently less localized than in the local Panurgidæ, all of which mix the pollen with honey.

In Melectidæ I would include a number of genera referred by Ashmead to Stelididæ—Ammobatoides, Biastes, Pasites, Neopasites. In *Ammobatoides punctatus* the female does not show a distinct pygidial area, but the male shows a distinct pygidial process. The postscutel in Ammobatoides and Biastes differs from that of local species in being more protuberant and surpassing the scutel.

The Euceridæ and Emphoridæ are separated in families which seem sufficiently distinct from Anthophoridæ.

Finally, there remains a possibility that the Pygidialia and Apygidialia had an independent origin from the pygidial and apygidial Sphecoidea. In that case, the Anthophila would not form a natural group.

In the description of the venation the nomenclature of Comstock and Needham, Am. Nat. 32: 414, 423, has been followed, except that III, IV and V are used for R, M and Cu; V_1 for M_4; V_2 for Cu_1;

VI (1st Anal) for Cu_2; vein *a* for *m-cu*, which I hold is the cross-vein element of the arculus (basal nervure); IV_3 in my table is the first recurrent nervure; cell 1st IV for M; 2nd IV for M_1; V_1 for M_2; V for Cu_1; VI for Cu. * Section 1 of vein IV=the vein separating cells III and 1st IV; when not otherwise indicated segment = dorsal segment of abdomen. Scopa relates to the ventral surface of the abdomen of females of Trypetoidea, and to the hind legs of other bees; it is the brush in which females place and carry their pollen, and is not applied to other parts or to bees which do not collect pollen; m. p. 6 = maxillary palpi 6 jointed; m. p. 1 longer than 2 = basal joint of maxillary palpi longer than the second; l. p. 1 = basal joint of labial palpi. Joints 3-4 are usually simple and subequal; 1-2, however, may be either one or both flattened, or may be both simple and, in either case, may vary greatly in length. I have adopted a formula giving the measurements of these two joints in 1/10 mm. Thus in Xylocopidæ l. p. 17:5 means that the basal joint is 17/10 mm, and the next 5/10 mm, and also indicates that 1 is more than three times as long as 2.

This synopsis is based upon the females, but the characters of the males have influenced me in some cases where changes were made. Usually the males of Pygidialia have a distinct pygidial area on segment 7, often on a distinct process, but some of them show no sign of it.

ANTHOPHILA.

Females.

Segment 6 exserted or retracted, with a pygidial area.....II.

Segment 6 exserted, without a pygidial area..... ..... I.

I. Apygidialia.

Vein IV_2 never strongly bent or directed outward before joining *m*; no facial foveæ; glossa filiform; m. p. shorter than galea..... 1.

Vein IV_2 strongly bent or directed outward before joining *m*; glossa flat, bilobed; l. p. simple, at most 1 = 2-3; m. p. 6, longer than galea; facial foveæ present; mandibles bidentate; cell III_{1+2} acuminate beyond vein III_4..... a.

a. Colletoidea

Submarginal cells 2, III. + III_5 and III_4, the first much longer; stigma large; cell III_{1+2} pointed near costa; vein IV_3 before or opposite

*Macroxyela seems to me more typical than the composite type of the authors, because the arculus is nearer the base of the wing, where it might be expected in a primitive case. To be sure, it does not show vein VI., but the position of that vein is indicated by an angle. See Comstock, Manual, 606.

III_5; *a* arcuate, about four times as long as section 1 of IV; *m* about as long as V_1; facial foveæ linear; black, at least the bases of tibiæ yellow; nearly bare; no scopa;

Prosopis in.....(1) Prosopididæ.

Submarginal cells 3, III as long as $III_4 + III_5$; stigma middle-sized; cell III_{1-2} with apex bent away from costa; vein IV_3 about middle of cell III_3; *a* only a little longer than section 1 of IV; *m* longer than V_1; facial foveæ clavate or oblong; black, abdomen with pubescent fasciæ; pubescence ordinary; femorilegid, scopa plumose, on trochanter, femur and lower border of tibia;

Colletes in.....(2) Colletidæ.

1. Submarginal cells 3; labrum wider than long, not concealed by mandibles, except sometimes at apex; l. p. 1–2 flat..... 2.

Submarginal cells 2, III and III_{4+5}, subequal; labrum longer than wide, base usually concealed by mandibles, apex often showing beyond them; mandibles at least bidentate; l. p. 1 usually shorter than 2..... b.

b. Trypetoidea.

Claws cleft, inner tooth subapical; vein *a* usually before V_2; IV_2 rarely before III_4; scutel surpassing postscutel; abdomen with coloured ornaments; *Anthidiinæ* in.....(3) Stelididæ.

Claws simple, sometimes with a basal tooth; vein *a* usually beyond V_2; IV_2 always before III_4; scutel rarely surpassing postscutel; abdomen usually with pubescent fasciæ.....(4) Megachilidæ.

2. Apex of segment 6 obtuse, without a spine or mucro..... d.

Apex of segment 6 with a spine or mucro, a little concave before the point; m. p. 6..... c.

c. Ceratinoidea.

Cell III longer than III_5, equals III_4; stigma large; cell III_5 strongly narrowed above; vein *a* arcuate; IV_3 near apex of cell III_5; apex of segment 6 mucronate; no malar space; mandibles tridentate; blue-green, clypeus, tubercles and knees each with a white spot; nearly bare; femorilegid, scopa simple, on anterior faces of femur and tibia, thin on femur; l. p. 8:7; 5–9 mm; *Ceratina dupla* in.....(5) Ceratinidæ.

Cell III shorter than III_5; stigma obsolete; cell III_{1+2} longer than 2nd IV.; III_4 as large as $III + III_5$; III_5 narrowed to a point above; vein *m* longer than V_1; IV_3 opposite III_5; IV_2 beyond middle of cell III_4; ocelli large, in a triangle on the front; a

carina between antennæ ; clypeus flat ; labrum small, with a basal tubercle ; malar space distinct ; mandibles bidentate ; m. p. longer than stipes, 1 about one-half as long as 2, 2 = 3, 3 = 4–6 ; galea enormous, broad, acuminate, rigid; l. p. moderately flattened, 17: 5, 3–4 minute ; segment 6 with strong apical spine and two converging rows ; hind metatarsus nearly twice as long as tibia, the latter with an excavated process ; scopa simple, almost limited to metatarsus ; black, with metallic reflections ; thorax above with ochraceous pubescence ; 21–25 mm. *Xylocopa virginica* in.....(6) Xylocopidæ.

d. Apoidea.

Cell III shorter than III_5 ; stigma small ; vein IV_3 before middle of cell III_5 ; malar space distinct ; mandibles broad at apex ; hind metatarsus shorter than tibia.....(7) Apidæ.

II. Pygidialia.

Clypeus protuberant or mandibles beveled so as to show all of labrum or a great portion of it ; labrum large, without basal process ; posterior angle of mandible before posterior line of eye ; thorax in profile declining beyond scutel, postscutel on posterior face, metathorax at most a little convex ; stigma small or middle-sized, rarely large ; glossa filiform ; l. p. 1–2 flat ; the hosts collect loose pollen and are crurilegid.*..... b.

Clypeus hardly protuberant and mandibles not beveled ; usually the labrum is small, concealed, except at base, and with a basal process ; posterior angle of mandible not before posterior line of eye ; metathorax produced beyond postscutel, in profile at least strongly convex, usually with a posterior and a discal space ; stigma large, rarely middle-sized ; vein *m* at most hardly longer than V_1 ; segment 6 usually retracted, the pygidial area then concealed under 5 ; glossa acute, flat, rarely filiform ; l. p. 1 various, 2–4 simple ; scopa femorilegid, on trochanter and anterior faces of femur and tibia, in those which collect loose pollen, crurilegid in those which mix the pollen with honey *..... a.

a. Andrenoidea.

Tegulæ very large ; segments 2–4 with greenish, somewhat opalescent apical fasciæ ; cell III_{1+2} longer than 2nd 1V, not acuminate beyond vein III_4 ; 3 submarginal cells, III about as long as

*Scopa wanting in inquilines.

III_4, III_5 shorter, subquadrate, with vein IV_3 beyond its middle; m. p. 6, a little longer than galea; l. p. simple, 5:1; glossa lance-linear, acuminate, shorter than mentum; mandibles bidentate; femorilegid, scopa plumose, a simple curl on base of femur; 17mm; *Paranomia Nortonii* in.....(3) Nomiidæ.

Tegulæ ordinary ..... 1.

1. Labrum free from mandibles, as large as clypeus, shorter than wide, transversely striate, without basal process; cell III_{1+2} pointed on costa; 2 submarginal cells, subequal; femorilegid, scopa simple, a thin floccus on trochanter plumose; mandibles bidentate; m. p. 6, longer than galea or stipes; l. p. simple, 6:4, longer than mentum; glossa lance-linear, acuminate, longer than mentum; nervures pale; thorax with dull ochraceous pubescence; segments with apical margins pale testaceous; 7–8 mm; *Halictoides marginatus* in.....(4) Dufoureidæ.

Labrum ordinary..... 2.

2. Hind tibia and metatarsus broad, with dense simple hairs, white on former, black on latter; pollen mixed with honey carried mainly on anterior faces of both joints; cell III_{1+2} pointed on costa; 2 submarginal cells, III and III_{4+5}, subequal; vein *m* about equals V_1; mandibles bidentate; m. p. 6, shorter than galea l. p. simple, 2:1; abdomen closely and coarsely punctured; 9 mm; *Macropis steironematis* in.....(5) Macropididæ.

Hind tibia and metatarsus ordinary 3

3. Cell III_{1+2} truncate; 2 submarginal cells; facial foveæ present, narrow, glabrous; mandibles simple; labrum with a median area; crurilegid, pollen mixed with honey carried mainly on anterior face of tibia .....(6) Panurgidæ.

Cell III_{1+2} pointed on or near costa, acuminate beyond vein III_4; usually 3 submarginal cells, $III = III_4 + III_5$, or nearly; vein *m* shorter than V_1; femorilegid; m. p. 6; l. p. simple, at most 1 = 2–4; glossa shorter than mentum; vein *a* rarely a little before V_2 . 4.

4. Vein *a* strongly bent or arcuate; *m* quite oblique to line of V_1; IV_3 beyond middle of cell III_5; no facial foveæ; scopa plumose, femur with long hairs posteriorly*; m. p. longer than galea, shorter than stipes; glossa lanceolate or lance-linear, acuminate.....(1) Halictidæ

*Scopa wanting in inquilines.

Vein *a* slightly arcuate; *m* nearly parallel to line of V_1; facial foveæ large, pubescent; mandibles bidentate; labrum with a basal process; scopa various, curl on trochanter and tuft on side of metathorax plumose; l. p. 1 arcuate.....(2) Andrenidæ.

b. Anthophoroidea.

Vein *m* shorter than V_1; labrum free from mandibles, except when much longer than wide; mandibles usually before middle of eye, the eye usually bulging behind them; pygidial area usually concealed by segment 5; pubescence rarely long and dense; scopa absent.....(7) Melectidæ.

Vein *m* distinctly longer than V_1; 3 submarginal cells, III shorter than $III_4 + III_5$, segment 6 exserted, showing pygidial area....1.

1. Cell III_{1+2} oblanceolate, shorter than 2nd IV, apex rounded, not bent away from costa nor separated for any great distance; stigma obsolete, or nearly; vein *a* straight; V_1 in line with IV_3, the latter parallel with *m*; metathorax truncate in profile; mandibles bidentate, not clasping labrum; scopa simple, on anterior face of tibia, a little pollen extending on base of metatarsus; m. p. 6, 1 hardly more robust than 2, at most hardly more than one-half as long; l. p. 1 at least three times as long as 2, much longer than paraglossæ.....(9) Anthophoridæ.

Cell III_{1+2} lanceolate, usually longer than 2nd IV, apex acute, bent away from costa and separated for some distance; cell III_4 strongly narrowed above; vein *a* beyond V_2; metathorax usually more convex in profile; mandibles simple or with an apical notch; scopa on tibia and metatarsus ..... 2.

2. Vertex crested, usually a little concave on each side, ocelli near its edge; middle joints of antennæ at least as long as wide; edge of labrum thin, hairy, clasped by closed mandibles; m. p. 1 twice as thick and at least about twice as long as 2; l. p. 1 longer than 2; paraglossæ at least as long as l. p. 1–2; scopa mainly on anterior faces of tibia and metatarsus, a little more copious on tibia; metatarsus broad, with a posterior apical appendage.. .....(10) Euceridæ.

Vertex not crested, strongly convex from side to side, ocelli more remote from its edge; m. p. 6, 1 hardly more robust than 2; l. p. 1 at most little longer than 2; paraglossæ shorter than l. p. 1–2; scopa black, thinly plumose, more strongly developed on outer border of tibia and posterior outer face of metatarsus; metatarsus narrow, poster apical appendage obsolete, or nearly....(11) Emphoridæ.

MISCELLANEOUS NOTES ON APHROPHORA PARALLELA, SAY.

BY A. ARSENE GIRAULT, BALTIMORE, MD.

This Spittle insect of the Pine was abundant on two trees on the campus at Blacksburg, Virginia, last summer, and an attempt was made to observe its oviposition and to work out its complete life-history.

Owing to lack of time this was not successful, but the following notes may be of some interest :

The Protective Secretion.—The material under which the nymphs live consists of a clear albuminous liquid, exuded by the insect, mixed intimately with bubbles of air introduced by the nymph after secretion ; it is tasteless, or slightly salty.

The mass is situated on either side of the twig, immediately back of the new growth as a rule. In 80 cases observed 76 were thus placed, the remaining four were several inches below the new growth. Only a single mass of secretion was usually found on a twig. As the insects increase in size and grow older, they become somewhat erratic and settle almost anywhere ; in the pupal stage they move in towards the trunk of the tree. The number of nymphs in a mass varies, generally there is only one, but as many as six or seven have been found. Those containing but a single nymph are easily distinguished from those including several by their relative size. A recently secreted mass is characterized by the imperfect state of its emulsion, the bubbles being large and the fluid consequently more or less clear ; in an old mass, the nymphs having been settled for some time, the bubbles are minute and the fluid is opaque.

Habits of the Nymph.—The nymphs move about at will, and wherever they settle cover themselves with the protective fluid, but as a rule they seldom move unless disturbed. As an experiment a nymph was removed from its position at 3.35 p.m. on May 13th, it crawled four inches down the twig and then back, occupying twenty minutes ; then it wandered about for nearly three-quarters of an hour, apparently sucking at times ; at 4.33 p.m. it climbed up about one-third of the length of a leaf and inserted its beak, the setæ only entering ; at 4.45 secretion had begun, and a shiny, colourless fluid was exuded from the anal opening and distributed along the body by the legs, this also served to mix the air with it. At 5 the insect had a cushion of air-bubbles under it, and five minutes later it moved on with part of the cushion towards the end of the twig. For nearly half an hour it wandered about, sucking at intervals,

and at 5.31 settled on another leaf nearer the end of the twig. Here the setæ were inserted and secretion was renewed. At 5.45 it moved again and crawled back nearer the end of the old wood and took up its final position lengthwise between the bases of two leaves. At 7.30 it had shifted its position to the other side, and there was no noticeable secretion. At 5.45 the next morning (May 14th) it was still in the same place and entirely covered with its secretion.

During the process of secretion the fluid flows slowly along the venter from a point near the anal opening, and gathers between the legs, where, by their alternate agitation, it becomes mechanically mixed with air and forms the cushion of air-bubbles.

Another nymph was taken at 3 p.m. on the 14th from its position beneath the protective mass and placed at an inch from the end of a limb; it crawled about two inches further down and settled with its head close to the base of a leaf, where it immediately inserted its setæ; secretion began at once, but was hardly perceptible until about 3.15, when a cushion of air-bubbles was noticed under the thorax and abdomen, especially surrounding the lower half of the latter. The insect then lowered the tip of the abdomen until the anal opening was under the fluid, when it began to generate bubbles of air, each bubble being followed by a dip in and out of the tip. This dipping in and out of the fluid was followed at short intervals by extensions of the abdomen, apparently to take in air, and then was renewed. The following count was made: 77 continuous dips producing 77 bubbles, then an extension, followed by 60 continuous dips.

By thus blowing out the fluid, it gradually submerged the abdomen and the rest of the body (3.37 p.m.). After the nymph was covered, the secretion of fluid and exudation of air continued until the body was completely hidden; the secretion was afterwards steadily maintained, for if it were not it would soon dry up. It is evident that the air is taken in at each upward and outward dip of the abdomen, and let out in the form of a single bubble at each inward and downward dip into the fluid. During this dipping process the ventral anal plates are in transverse motion like jaws, and it is probable that the secretory glands are between them.

The nymphs have the habit of extending the abdomen at regular intervals beyond the frothy mass; this is also done when they are walking. Their locomotion is slow, tedious and deliberate, but they can move quite fast, in a rambling fashion, when they are disturbed. Their position in

the mass is one of convenience, the tip of the abdomen being near the surface, and when disturbed they move to the other side.

The following dates were recorded: May 11–12, 2nd moult; May 15–18, 3rd moult; May 26, 4th moult, pupæ; June 11, 5th moult, adults, several pupæ still present; July 5, adults to be found, but gradually disappearing.

Description of the Nymph.—The colours in the larval state are the same throughout, with minor variations for successive stages. As the nymphs become older and larger the colours are more pronounced, the eyes becoming wholly red and annulate with ochreous. The stages are not simultaneous throughout the colony; the difference in size between the different stages is noticeable. The wing-pads are faintly seen in the 4th stage.

Third stage, 2nd moult (see figure).—Head, thorax, antennæ, beak, legs, eyes, supra- and infra-anal plates, overlapping lips of tergites on ventral segments, glabrous black; abdomen, median line of head and thorax, edges of prothorax, knees, and two basal articulations of legs, most of thoracic sternum, dorsal thoracic articulations, ochreous yellow; abdominal sternum blood-red, gradually shading into ochreous latero-dorsad. General shape that of an alligator; head prominent, constricted, large, distal two-thirds broadly rounded, hemispherical on dorsal aspect, blunt and subquadrate on cephalic aspect, basal third as wide as thorax; antennæ short; setiform, not as long as head, 9-jointed, first joint rectangular, flat above, 2nd globular, 3rd cylindrical, as long as the next two combined, 4th and 5th and next three sub-equal respectively, terminal joint minute, ending in a hair; the antennæ are inserted on the side of the head at the constriction, just cephalad of the eyes; eyes prominent, bulging, comparatively large, situated on basal third of the head, on the lateral

Fig 1.

aspect, suffused red and black; thoracic segments normal; legs comparatively large; tarsal joints two, the distal twice as long as the basal, bearing two large claws; distal end of tibia bearing a semicircle of stout long spines beneath; femur ochreous beneath; beak long, 3-jointed, reaching to 4th abdominal segment, black marked with ochreous; abdomen longer than head and thorax combined, broad at base, tapering, 9-jointed, the tergites extending well beneath to the ventrum, and each ending in a leaf-like plate, coloured black and ochreous (two terminal ones black), forming a broad channel along the median line, the bed of which is formed by the sternites; 3rd sternite bearing a peculiar nipple-like red fleshy process, hidden by the overlapping tergites, minute, analogous to that in the locusts (Acrididæ) between the bases of the cephalic coxæ. Length, full-grown, 6.25 mm.

After a moult the nymphs are softer and pale, the thorax and head lemon-yellow, the abdomen dark along the mesero-, yellow at the latero-cephalic angles and at tip; reddish beneath and along the sides. Eyes black, annulate. Legs and beak pale yellow, the latter with a median line of red. The normal colours are acquired in about an hour and a half.

Pupa (5th stage).—General shape and colour of the preceding stages. Body pale ochreous yellow, mottled on head, thorax and wing-pads with more or less diffuse brown; tip of abdomen verging to black; eyes red, with some black; antennæ black, glabrous; legs concolorous with head and thorax. General colour varies from pale ochreous brown to brownish-black with pale mottled streaks. Underneath ochreous, with red on sides of abdominal segments and black down the median line. Head distinctly striate on ventral and lateral aspect. Wing-pads not large, but easily noticeable; process between abdominal tergites on ventrum absent. Length 6.25–8 mm.

Adult.—June 11th to 21st, adults found and watched continuously, June 22nd, found adults crawling slowly about on the branches, with a movement similar to that of the nymphs; found at rest generally where the young nymphs locate; not easily disturbed, and rather sluggish, but when touched they jump awkwardly to some distance, making a sound similar to that of a steel spring when suddenly loosened; the jump is made with much force. They are easily observed and seem to spend their whole time in feeding, remaining quietly in a position similar to that of the young nymphs. When once settled they very seldom move, but remain quiet like a piece of the tree itself; the only evidence of life is given by the forcible ejection of small, colourless, tasteless drops of a

watery secretion at regular intervals, three or four drops are emitted every two or three seconds; three drops every two seconds is a usual amount. On June 23rd, after watching for two days at a time, during all hours of day and night, two were at last found *in coitu*. They were end to end, and remained united for twenty hours. Although during several days following, pairs were found connected and were watched constantly, and after separation the female was in some few cases isolated, and in others left free and undisturbed, no signs of oviposition were ever indicated. They were always quietly feeding or wandering from place to place, with, apparently, no care but that of feeding, no aim but to rest. Gradually they disappeared; there is probably but a single brood in this locality.

A NEW BEE IN THE GENUS DIPHAGLOSSA.

BY J. C. CRAWFORD, JR., WEST POINT, NEBR., AND E. S. G. TITUS, WASHINGTON, D. C.

Spinola in 1851 described and figured *Diphaglossa Gayi* as a new species and new genus closely related to *Anthophora*. It was founded on males and females collected in northern Chili, "Santa Rosa, Coquimbo, etc." He figures the insect (natural size), face view of head and mouth-parts, wing, antennæ and leg.

F. Smith in 1854 gave a partial description of the genus, probably not from specimens, reporting the male only as known. He placed the genus immediately after *Anthophora* in his catalogue, and Dalle Torre in his catalogue in 1896 has followed Spinola and Smith in placing the genus in the *Anthophoridæ*.

In 1898, in a monograph of several closely related genera of bees (*Megacilissa*, *Caupolicana*, *Diphaglossa* and *Oxæa*), Dr. H. Friese regarded *Diphaglossa* as an offshoot of *Megacilissa*, which, according to his view, had been derived from *Colletes* through *Caupolicana*. He had examined males and females from "Santiago and Valdivia (Lossberg)," and 6 females and 1 male from "Chili (Phillippi)," in the Vienna Museum.

In his "Classification of the Bees," in 1899, Dr. Wm H. Ashmead placed the genus in the family *Colletidæ*, citing most of its principal characters in the generic table for the family.

Diphaglossa, Spinola, 1851, and *Diphaglossa Gayi*, Spinola, 1851.
Spinola, 1851, Gay: Hist. Fisc. de Chili, Zoology, VI., pp. 168–170, plate 1, fig. 1, ♀ ♂.
F. Smith, 1854, Catalogue Hymen. Brit. Mus., II., p. 343–344, ♂.
Dalle Torre, 1896, Catalogue of the Hymenoptera, X., p. 297, ♂.
Friese, 1898, Ann. Naturhist. Hofm. Wien., XIII., p. 61, 72, 76, 77, ♂ ♀.
Ashmead, 1899, Trans. Amer. Entom. Soc., XXVI., p. 94.

Diphaglossa is characterized by the peculiarly elongate, triangular head, the face being three times as wide at the vertex, from eye to eye, as at the base of the mandibles along the clypeal margin; clypeus elongated, twice as long as broad, longitudinally striate; mandibular space much elongated, punctured, longitudinally striate; antennæ reaching beyond tegulæ; mandibles bifid at tip; labial palpi 4-jointed, three basal joints subclavate, fourth joint longest, more slender and slightly tapering; maxillary palpi 6-jointed, joints subclavate, except the last, which is slender, slightly tapering, fourth and sixth joints almost equal, second shortest, first longest; wings with marginal cell slightly appendiculate, first cubital cell longest, but not as long as second and third united, third smallest, narrowed above, first recurrent nervure entering second cubital cell at the middle, second recurrent nervure more or less curved, entering the third cubital beyond the middle; transverse median nervure entering before radial nervure and weakly angulated; first joint of tarsi flattened, elongate, claws bifid and with a pulvillus; metathoracic truncation narrow, almost perpendicular, no row of pits present; abdomen with distinct dorsal and ventral hair bands.

Spinola has figured the tongue as emarginate and with two pairs of slender "filaments," the apical pair very long. While the tongue is undoubtedly emarginate, the "filaments" are missing in all of the specimens we have examined. However, Dr. Friese states that the paraglossæ are slender and threadlike, extending beyond the tip of the tongue. Spinola states that the mandibles have three teeth, but his figure shows but two, and he also gives the hind tibiæ as unispinose. Dr. Friese has corrected this, stating that they are spined as usual, and in all the specimens we have examined they have two spines.

Diphaglossa Gayi, Spinola, the type of the genus, is described as black, with a long-haired red abdomen, and Dr. Friese notes that it resembles in habitus the red-haired *Bombus pascuorum*. The wings are thickly set with fine short hairs.

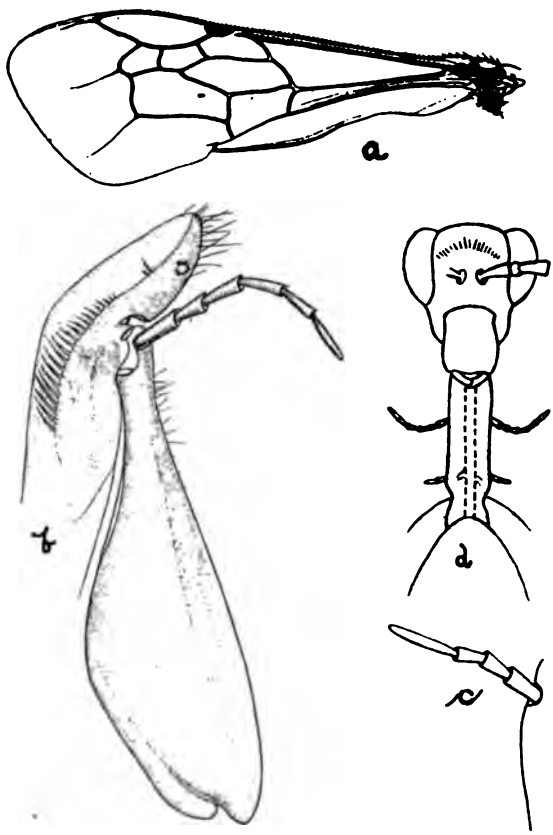

FIG. 2.

Diphaglossa Spinolæ: a, wing; b, maxilla and maxillary palpus; c, labial palpus. *Diphaglossa Gayi*, Spin.: d, face and mouth-parts. (Copied from Spinola's Fig. 1a.)

Diphaglossa Spinolæ, n. sp. (Figure 2.)

♂.—Length 10 mm. Black, head, thorax and first two dorsal and ventral abdominal segments clothed with golden-yellow pubescence, very dense on face, cheeks and thorax; clypeus remarkably long, obsoletely crenulate at apical margin, mandibular space with large sparse setigerous punctures, often so large as to cross several of the longitudinal striæ; labrum black, polished, with several minute tubercles, the central one the

largest; mandibles black at base, red at tips, the outer tooth longest and pointed; there are two grooves running from the tips to the base of the mandibles; antennæ brownish-black, second joint small, globular, third joint very slender at base; tegulæ shining, reddish, wings with dark veins, second recurrent nervure weakly curved, entering third submarginal cell about two-fifths of its length from its apex; wings set with fine short hairs; legs black, with long, thick, gray hair, tarsi reddish, pubescence inclining to fuscous, tips of claws very dark; punctures of head and abdomen medium and quite close, of the mesothorax sparse, the metathorax smooth; abdomen with dorsal and ventral segments 1–6 having apical appressed hair bands, varying from gray to yellow; some short yellowish pubescence on dorsal segments 3–7, and still more short pubescence on ventral segments.

Habitat: La Paz, Bolivia, 14th November, 1898. 7 ♂ specimens.

One ♂ placed in U. S. Nat. Mus., type No. 6854.

In one specimen the pubescence is quite gray, perhaps only faded.

The drawings for the figures, excepting the copy of Spinola's figure, were made by Mr. Otto Heidemann, of the Division of Entom., U. S. Dept. of Agriculture.

The authors desire to express their thanks to Prof. Lawrence Bruner for his kindness in loaning three specimens of this species from the collection of the University of Nebraska.

THYREOPUS LATIPES, SM.

♀ and ♂ new to Vancouver. Hitherto only the male of this fossorial wasp had been known. The males recorded in the literature came from Nova Scotia, Canada; Montana, Colorado, Arizona, Oregon and Washington. The female is related to *T. medius*, Fox, but differs in size, sculpture and ornamentation, particularly in the contrast between the deep median sulcus on the metanotum and the regular subdued sculpture adjoining. In *medius* the sulcus is not sharply outlined, nor is there a strong contrast between it and the sculpture of the adjoining area which is rough. The female of *T. latipes* is much like the male, and is readily referred to its fully described sex. Prof. Harvey sent one female taken 21st June, 1903, and one male 19th June, 1903, to Dr. Henry Skinner, who referred them to me for identification.

HENRY L. VIERECK, New Haven, Conn.

pubescence, the apices of the tarsal joints with a tuft of rufous hairs within; spurs testaceous, claws ferruginous. Abdomen short, dull, the first segment evenly covered with fine, deep punctures, separated about the width of one, the second and third segments more finely and closely punctured, fourth and following segments with the punctuation fine but indistinct; apical margins of the three basal segments conspicuously depressed; no hair bands, but the whole abdomen sparsely covered with short pale hairs, which are somewhat elongated and tinged with fulvous on extreme base of first segment. Length, 10 mm.

♂.—Unknown.

One ♀, Monte Redondo, March 3, 1902 (L. Bruner). Altitude 4,000 feet. Type in collection of University of Nebraska.

THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Continued from page 30.)

The Club held a second informal meeting in the Southern Hotel, St. Louis, on December 31, 1903. Dr. James Fletcher presided, and the discussions which were presented during the evening indicated the cleverness of the president in selecting speakers and assigning interesting topics. The evening was spent in a congenial and unusually profitable manner until the incoming of the new year.

Prof. Lochhead, of Guelph, presented to the Club a number of incidents relating to a trip to Killarney, Lake Huron, and the numerous islands in that vicinity. The habits of the native Indians were described in an interesting manner. These Indians are in a prosperous condition, as evidenced by the good horses and carriages which they own, and by other possessions. The Jesuit missionary schools have apparently had a great influence upon the prosperity of the Indians through their training in mechanical and other sciences. On St. Joseph Island the drama of Hiawatha is played every year by the Ojibwa Indians. The version of the drama followed is that of Longfellow, and the daughters of Longfellow were once present by invitation. The play is given out-of doors, with logs for [illegible] seats and bearskin seats for an extra price of 25 cents. A [illegible] ce calls the people together. The whole career of Hiawatha [illegible] all its details, accompanied by excellent representations of

NOTES ON NORTH AMERICAN STRATIOMYIDÆ.

BY A. L. MELANDER, CHICAGO.

(Continued from page 24.)

List of the species of *Odontomyia* studied.

1. *O. binotata*, Loew.
   Chicago, Ill. (July); Austin, Tex. (May); Colo.
2. *O. cincta*, Olivier.
   Chicago and Algonquin, Ill. (June).
3. *O. dorsalis*, Fabricius.
   Hayti.
4. *O. arcuata*, Loew.
   Chicago, Ill. (July); Colo.
5. *O. nigrirostris*, Loew.
   Chicago, Ill.; Austin, Tex.; Colo.; Lusk, Wyom. (August).
6. *O. nigerrima*, Loew.
   Chicago, Ill. (May).
7. *O. pilosus*, Day.
   Vancouver Isl. (June).
8. *O. trivittata*, Say.
   Chicago, Ill. (July); Mexico.
9. *O. vertebrata*, Say.
   Chicago, McHenry, Ill. (June, July).
10. *O. hydroleonoides*, Johnson.
    McHenry, Ill. (June).
11. *O. Aldrichi*, Johnson.
    Galveston, Tex. (June).
12. *O. virgo*, Wiedemann.
    Virginia; Maryland; Toronto, Ont.; McHenry, Ill. (June, July).
13. *O. pilimana*, Loew.
    McHenry, Chicago, Ill. (June, July).
14. *O. microstoma*, Loew.
    Woods Hole, Mass. (July).
15. *O. pubescens*, Day.
    Chicago, Ill. (May).
16. *O. interrupta*, Olivier.
    Chicago, McHenry, Ill. (May, July).
17. *O. hieroglyphica*, Oliv.
    Chicago, Ill. (August); Austin, Tex. (May).
18. *O. flavicornis*, Olivier.
    Austin, Tex. (April).

In addition to the species here mentioned, there are three undetermined specimens. One of these represents an undescribed genus, but is mutilated. The other two belong to *Cyphomyia* ; of these one is from Austin, Texas, the only recorded instance of this genus being taken within the United States. As the descriptions of *Cyphomyia* are not accessible to me, these species must be omitted.

CATOCALÆ IN DR. HOLLAND'S MOTH BOOK.

BY G. H. FRENCH, CARBONDALE, ILL.

Within the last few years three books have taken their place in the scientific literature of this country that should make a great advance in the study of natural history in our high schools. The first was "The Butterfly Book," by Dr. W. J. Holland; the second, "The Insect Book," by Dr. L. O. Howard, and the third, recently out, "The Moth Book," by the author of the first. The cheapness of these three volumes places them within the means of any high school that makes any pretense to having a reference library, while the excellent plates, photographed from the specimens, make them of great value to the young who desire means for identifying their captives.

Without taking further space to speak of the general merits of "The Moth Book," I wish to point out a few errors in the names of the plates of Catocalæ. Plate 31, figure 14, is given as *C. obscura*, Strecker. This is evidently *C. residua*, Grote. The fringes of the hind wings of *C. obscura* are white, or white with only the fringe at the ends of the veins black. In *C. residua* there is only a very little white at the apex of the hind wings, as in this figure.

Plate 35, figure 13, is given as *C. Stretchii*, Behr. This is probably *C. Mariana*,, Hy. Edw. I have bred *C. Stretchii* from eggs, and find the fore wings quite variable within certain bounds, but in none of them is there the colouring of *C. Mariana*. The hind wings have two characteristic marks ; the median band very narrow and terminating in a distinct hook, and a patch of red at the apex outside the black band, but inside the white fringe. Below the apex there are smaller red patches between the black veins. The fringes are white except where the black of the veins extends into the fringe.

I am glad to see *C. amasia*, A.-S., as figure 1, plate 35. I would have furnished Dr. Holland with a specimen of its companion, *C. Cordelia*, Hy. Edw., having the same range of locality, if I had known he desired it.

NEW SPECIES OF NORTH AMERICAN TABANIDÆ.

BY JAMES S. HINE, COLUMBUS, OHIO.

Chrysops fulvistigma, n. sp.—Female. Palpi yellowish, antennæ slender, first segment yellowish, slightly darker at apex, second and third segments brown, annulate portion nearly black. Face shining black, covered next the eyes and on the anterior parts of the cheeks with yellowish-gray pollen. Front yellowish-gray pollinose, callosity and region surrounding the ocelli shining black. Thorax dark, nearly black, with grayish pollen above, giving the impression of stripes before the suture; coxa, basal two-thirds of femur and base of tibia of anterior leg, and nearly the whole tibia and base of tarsus of middle leg, yellow; remainder of legs dark, nearly black. Wing almost hyaline, costal margin from base to apex, and a narrow cross-band abbreviated behind pale brownish, stigma conspicuously brownish-yellow. Abdomen yellow at base, black at apex. Dorsally, a large, nearly square, black spot beneath the scutellum reaching the posterior margin of the first segment. Second segment with two contiguous, black triangles, their bases on the posterior margin of the segment and their apexes not attaining the anterior margin; otherwise the first two segments are yellow; remainder of the abdomen black, with the exception of a small, pale yellowish triangle on the third segment. Ventrally the first two segments are yellow, with the exception of a linear, black spot on each lateral margin, and a suggestion of the same colour at middle. The yellow also extends back on to the third segment on each side of the midventral line.

Length slightly more than 7 millimeters. Two females taken at Raleigh, N. C., by C. S. Brimley, July 15 and 17.

A very distinct and interesting species. It has somewhat the aspect of *lugens*, Wied., *univittatus*, Macq, and *obsoletus*, Wied., but the nearly hyaline wings and black face are characteristic. As a pale brownish colouring follows the costa to the apex of the wing, the species may be said to belong to the group with an apical spot, and is the second North American species of the group with an entirely black face, but this one lacks the yellow pollinose stripe from base of antennæ to margin of mouth, a character very evident in *frigidus*, O. S.

The species is larger than *nigribimbo*, Whitney, and not to be confused with it except in coloration of wings.

Chrysops Brimleyi, n. sp.—Female. Palpi and proboscis black, antennæ about normal in length and thickness, first segment yellow,

JOCULAR ENTOMOLOGY.

The action of our friends who publish Entomological News, in putting on the title-page of that excellent journal the figure of an insect, with the legend "*Ignotus ænigmaticus*, Slosson," creates a situation hitherto unknown in entomology.

In Mrs. Slosson's delightful article on "A Coleopterous Conundrum," in the CANADIAN ENTOMOLOGIST for July, 1903, she asks this question: "Shall I ever find more specimens of what I have sometimes, in chat with friends, called *Ignotus ænigmaticus*? I trow not." This is the sole basis for the application of the name, as fully admitted in the January News.

If we adopt the principle upon which the News acts, it will afford great relief to those who have been labouring in descriptive entomology for lo! these many years. It is evident that our pains have been wholly unnecessary. Chatting with our friends, we need only mention any Latinized jingle that occurs to us under the inspiration of the moment; then let this leak into print, and all is accomplished.

We may expect that the general adoption of this method will bring about a rapid increase of new genera and species. Now that it is unnecessary to go through the tedious process of describing, figuring, comparing and writing out, no one need hesitate to enter the field. It is highly probable that some of us name insects in our sleep, and never knew it before. Let us merely employ an amanuensis to sit by and take down our mutterings, after a long evening spent in the old-fashioned sort of entomological labour, and doubtless in the morning we shall be rewarded by a fine list of new genera and species, some of which will perhaps be so interesting as to subsequently adorn the covers of entomological journals.

One of my friends has an infant son, two years old, who has already named several new genera and species. His chat is not very fluent, but his names are not preoccupied, and compare very well in appropriateness with the one given above. Some of the endings look rather unlike old-fashioned Latin, but this is easily cured. If I were to enumerate some of his appellatives, there is no reason to doubt that they would stand hereafter as valid names for the species to which he has applied them. I refrain from giving them publicity, as I think his father would like to do it.

J. M. ALDRICH, Moscow, Idaho.

GASTROPHILUS EPILEPSALIS LARVÆ AND EPILEPSY.

BY G. H. FRENCH, CARBONDALE, ILL.

In the October number of the St. Paul Medical Journal, Dr. Burnside Foster, the editor, gives a very interesting case of larvæ found in the cutaneous tissues of a three weeks old infant, that a specialist in Dipterology identified as the above species. The case was not one of Dr. Foster's patients, but was from Superior, Wis. If the identification is correct, and I see no reason why it should not be, for the specialist was the same one who identified the first larva found in the boy at Chester, Illinois, as a *Gastrophilus*, and he had one of the types before him for comparison, the case is important. How they came to be in the child's skin is an interesting question, and in a brief note in reply to Dr. Foster's article, I suggested an examination of the excreta of the mother.

In the November number of the same journal, Prof. F. L. Washburn, State Entomologist of Minnesota, publishes a paper on the same subject. In the issue for January 16th of the Journal of the American Medical Association, Prof. Washburn has an article that is nearly a copy of the one in the St. Paul Medical Journal. It is of a few statements in these two articles that I wish to speak.

I do not know whether the fly producing these larvæ is a *Gastrophilus* or not, and that question can not be settled till some of the living larvæ are found and bred. One of the best authorities on Diptera in the United States says they are, and there it will have to rest till breeding proves him right or wrong.

I never assumed that by naming this larva *Epilipsalis* it was *the* cause of epilepsy. In fact, epilepsy is not a disease, but a symptom resulting from some irritation somewhere in the body of a neurotic with a spasm tendency. But that this has been in five cases the source of irritation, or at least one of the sources, there is no question in the minds of those knowing the conditions. In two of these cases, the two best known to myself, the removal of the parasites from the system cured the cases. Again, in the five cases where these larvæ had been found previous to the Wisconsin infant, the hosts were epileptics. I have said before that from the wide distribution of the insect the probability is that it is not an uncommon human parasite, but that its small size—one-twelfth of an inch long—and causing so little irritation in ordinary individuals, its presence has been overlooked. Previous to Dr. Foster's case it had been found in three places in Illinois, one in Kentucky and one in Indian Territory.

Prof. Washburn says: "This intestinal parasite *evidently* has no connection whatever with epilepsy, and is wrongly named." The italic is mine. The last clause of the statement is answered above. As to the

rest of it, if Prof. Washburn were a little more familiar with human pathology he probably would not have written the sentence. The writer has spoken before hundreds of physicians on this subject, some of them the best nerve specialists in the United States, and not one of them has ever raised a question as to its being one of the causes of epilepsy.

Prof. Washburn questions my assumption that the larvæ might be reproduced in the intestines by parthenogenesis. I do not believe I wish to add anything to my original statements in the CANADIAN ENTOMOLOGIST when naming the species in 1900. At the time of writing then I gave the subject a careful investigation in the literature of this country and of Europe.

I do not know how these larvæ gain access to the digestive canal of man. That is one of the things for future investigation.

JOHN ALSTON MOFFAT.

It is with profound regret that we announce the death of our dear and greatly-esteemed friend, MR. JOHN ALSTON MOFFAT, which took place at the Victoria Hospital on Friday evening, February 26th. For the last six months Mr. Moffat had been in poor health, but continued to frequent the Society's library and to discharge, as far as his strength permitted, the various duties that devolved upon him. He was very unwilling to give up, and resisted as long as he could the attacks of weakness and old age. At last, on the day before Christmas, his condition was such that he could bear up no longer, and with great reluctance he went to the Victoria Hospital, where he remained till the end came. His ailment was pronounced to be "senile decay," aggravated by much digestive weakness. He suffered much discomfort, though little acute pain, and bore with great patience and gentleness all that he was called upon to endure. At the advanced age of fourscore years, he knew that his days were numbered, and was quite prepared to leave this world when the summons came.

For the last fourteen years Mr. Moffat has been the Librarian and Curator of the Entomological Society of Ontario, and during that time endeared himself to all with whom he came in contact by his gentleness, kindness and courtesy. It was always a pleasure to him to identify specimens, and to exhibit the beautiful objects in the Society's cabinets to anyone who was interested in natural history. We shall miss him sadly at our meetings, and our library will seem desolate without his familiar voice and figure. He was a constant contributor of notes to this magazine and of more elaborate papers in our annual Reports. The volume for 1903, which is now in type, contains an article from his pen, entitled "Recollections of the Past"; this will be read with great interest by his many friends. It contains some reminiscences of his life, and relates how he came to study entomology, through the necessity for an outdoor life caused by ill-health. C. J. S. B.

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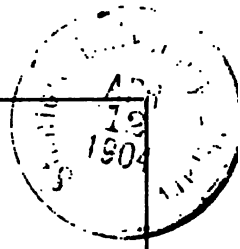

The Canadian Entomologist

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No. 4.

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EDITED BY

REV. C. J. S. BETHUNE,

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APRIL, 1904.

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1904.

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The Canadian Entomologist.

VOL. XXXVI. LONDON, APRIL, 1904. No. 4

THE DIPTERA OF BRITISH COLUMBIA.

(First Part.)

BY JAMES S. HINE, COLUMBUS, OHIO.

During the summers of 1901–2, while at the Minnesota Seaside Station on Vancouver Island, Professor Raymond C. Osburn collected a number of Diptera, and during these same seasons and the past summer Professor R. V. Harvey, of The Queen's School at Vancouver, British Columbia, collected in the same order. Since so little has been published on the Diptera of that province, we have thought that even a short paper on the Dipterological fauna would be of interest and probably of some value.

These gentlemen have very kindly turned over their material, with the exception of the Syrphidæ, with the request that I should make the determinations and publish the results. I have encountered more or less difficulty in making these determinations, but have been ably aided in some cases by Mr. D. W. Coquillett, of the U. S. National Museum. Besides a number of specimens still undetermined, four new species have been described from the material. Two of these are described in this paper, one, *Anthalia stigmalis*, was described by Coquillett in the Proceedings of the Entomological Society of Washington, V. 268, and I described the fine Crane-fly, *Pedicia magnifica*, in The Ohio Naturalist, III., 417.

I have not considered the Syrphidæ in this part of the paper. Professor Osburn paid special attention to collecting the members of this family, and has spent much time in studying them and comparing with types in the U. S. National Museum. It is his intention to follow with a second part and give full notes regarding the field observations taken on many of the species.

As the field-work for this paper was done by others, I have no extended notes to offer, but in working over the material some few things have suggested themselves.

The list given below includes a number of species that have been

taken in California, as well as a number that have been taken in Alaska. Some of the species are known to occur all along the coast from California to Alaska, and are thus proven to have a wider range than most species are supposed to have. *Pedicia obtusa* and *Tabanus Sonomensis* were described from California; I have identified them from British Columbia, and Coquillett reports them from among the material taken in Alaska by the Harriman Expedition. Other species in the list may be shown to have the same or even a much wider range.

Only two species of mosquitoes are included in the list, and we have two others not yet determined, but this does not indicate that there is a dearth of these insects in the region, for Dr. Dyar has recently published a paper in the Proceedings of the Entomological Society of Washington, in which he enumerates twenty species from British Columbia. This serves to show us that there is plenty of opportunity for entomological work in this interesting region, and that the most interesting results are obtained by taking a small group and thoroughly collecting the forms belonging to it.

The Tabanidæ of British Columbia, as well as from the western United States, are a perplexing lot, and I have spent much time working on them, sometimes with satisfactory results, sometimes otherwise. Excellent characters have been found for some of the species, but for others the distinguishing marks are not apparent as yet. It seems that some of the species are quite variable, and that there are more species described than can be differentiated. Nearly all the species of Tabanus belong to the sub-genus Therioplectes, only two of those received having the eyes nonpubescent. In California *Tabanus punctifer* and *ægrotus* occur together, but although I have repeatedly received the latter from British Columbia I have never known of a record for the former.

The family Leptidæ is represented by a number of interesting forms. *Xylomyia parens*, Will., appears to be rather commonly met with. The two specimens before me were taken at Vancouver on June 21st and July 4th. The species looks something like some of the sawflies, and can easily be confounded with them by the inexperienced. The species of Symphoromyia are said to bite severely, and are therefore somewhat of an annoyance to the collector and to stock in that region.

I have been interested in studying *Rhynchocephalus Sackenii*, Will., for it is surely an interesting form, and represents a family not commonly met with in North America. I have seen only one specimen, and that

was taken at Vernon, which must be a splendid collecting region, if one can judge from the species taken there.

Fully as interesting as the last species is *Pterodontia misella*, O. S., taken at Wellington, July 6th. The original description of the species was written from a specimen taken in Oregon by Henry Edwards.

The family Tachinidæ is represented by numerous species, some of which are widely distributed, but a number are known only from that region. The presence of these flies is always welcomed, for we have learned of so much good accomplished by them that we suspect their mission is a beneficial one, and are willing to let them have their way, especially if we note in them a tendency to direct their attacks to any of the species that are known to be injurious. The following breeding records accompanied the specimens sent: *Panzeria ampelus*, Walker, reared from a chrysalis of *Clisiocampa* (?) *Americana; Frontina Frenchii*, Will., reared from *Telea polyphemus*; and *Bombyliomyia abrupta*, B. and B., reared from pupa of *Halisidota maculata*.

Pyrellia ænea, Zett., has not been reported from North America heretofore, but some specimens before me agree so well with the description of that species as given by Schiner that I am well satisfied to give them that name. The group of Muscids to which this species belongs is widely distributed in this country and in Europe, so it is not strange to find it here, but the detection of the presence of an introduced species is always attended with more or less interest.

It is interesting to note that the usual stock pests are present in British Columbia as well as in other parts of North America. *Simulium fulvum*, numerous species of mosquitoes, horse-flies, the bot fly, and species of the genus Symphoromyia are noted, and must be a consideration with reference to the stock interests of the province.

A number of species commonly known as scavengers are noted, and it seems that these are more numerous in individuals than is usually common in much of the western country.

Euparyphus obliquus, n. sp.—Female: Black, with yellow markings on head, thorax and abdomen. Face black, with an oblique yellow fascia on each side about midway between the vertex and the insertion of the antennæ. Antennæ black at each extremity, with the intervening parts rather light brown. Face black, with a triangular yellow spot on the anterior part of each cheek, and a very narrow whitish pollinose space along each eye, posterior orbits yellow, occiput shining black. Thorax

black, with yellow on each half, as follows: a narrow dorsal line from anterior border to beyond the suture, a large spot distinctly furcate before, above the base of the wing, an elongate triangular spot before the suture, a small humeral spot narrowly connected with a stripe, which reaches the base of the wing, and which is five or six times as wide posteriorly as where it joins the humeral spot, a rather large geminate spot below the base of the wing, and one or two small spots above the posterior coxa. Scutellum yellow, with the base narrowly shining black; halteres yellow; legs yellow, except the median part of each femur, which is black; wings hyaline, stigma and principal veins yellow, third vein not furcate. Abdomen black, with yellow on each half, as follows: a narrow lateral margin connected with a small spot on second segment, an oblique fascia on each of the third and fourth segments, and the rather broad apex of the fifth segment; venter black, with irregular yellow patches on the middle of the second and third segments. Length, 6 millimeters.

Habitat: Taken at Vernon, British Columbia, August 8th, 1902.

On account of the oblique yellow markings on the front, the name *obliquus* is given this species.

We hesitated at first to describe this species from a single specimen, but as we have studied practically all the types of the species of the genus without identifying the specimen, have concluded to name it.

Anthrax Harveyi, n. sp.—Ground colour deep black, clothed above with light yellow and golden yellow pile, beneath with black pile. Head black, face and front clothed with black pile, proboscis projecting slightly beyond the margin of the mouth. Thorax clothed on the dorsum and sides with rather long, light yellow pile, on the sternum with black pile, legs black, with black hairs, and all the tibiæ with distinct spines, wings hyaline except costal cells and basal areoles, which are black; the branching of the second and third veins takes place almost opposite the small cross vein, and the common stock of these veins is narrowly margined with black almost to where they branch, halteres yellow, of nearly the same colour as the pile of the sides and dorsum of the thorax. Abdomen with the dorsum clothed with long and rather dense pile, that on first segment light yellow and on the remaining segments golden yellow, a few black hairs at the apex of the abdomen, venter entirely clothed with black hairs.

Total length 8–10 mm. The species seems to be related to *fulviana*, but besides being smaller differs in the colour of the vestiture of the body.

Habitat: Mount Cheam, near Agassiz, British Columbia.

Professor R. V. Harvey, who collected the specimens, and after whom the species is named, sends the following note: Mount Cheam is a peak in the Cascade Range, and rises abruptly from the west bank of the Frazer River opposite Agassiz station, on the Canadian Pacific, about 70 miles from the coast. It attains a height of 8,000 feet, but the spot where these specimens were obtained was some 1,500 feet lower, in a grassy valley clothed in brake-fern and various flowering plants. The species appeared to haunt a clump of low bushes of a species of mountain ash, whose flowers seemed to attract insects in some numbers. Most of the specimens were taken while resting on bare stony patches among the fern adjoining the clump mentioned.

If there are those who have aided me in any way in getting the material for this paper together, and if I have not given them credit, I wish to thank them for their part in the matter. I say this because I suspect that some of the specimens have been collected by parties not mentioned, but I have used the data at hand and given the facts so far as I am in a position to know them.

The following is a list of the species identified, and the localities where they were taken:

Simulium fulvum, Coq. Pt. Renfrew, Glacier.
Bibio nigripilosus, Lw. Victoria, Glacier.
Culex incidens, Thomp. Pt. Renfrew, Vancouver.
Culex varipalus, Coq. Pt. Renfrew.
Pedicia obtusa, O. S. Pt. Renfrew.
Pedicia magnifica, Hine. Pt. Renfrew.
Xylomyia parens, Will. Victoria.
Xylophagus decorus, Will. Wellington.
Xylophagus rufipes, Lw. Pt. Renfrew.
Sargus decorus, Say. Vancouver, Victoria.
Sargus viridis, Say. Vernon, Victoria.
Euparyphus obliquus, Hine. Vernon.
Odontomyia Hoodiana, Bigot. Vancouver.
Odontomyia pubescens, Day. Vernon.
Stratiomyia barbata, Lw. Victoria, Vernon.
Stratiomyia laticeps, Lw. Vernon.
Pangonia fera, Will. Agassiz.
Chrysops proclivis, O. S. Victoria.

Chrysops noctifer, O. S. Vancouver, Goldstream.
Silvius gigantulus, Lw. Pt. Renfrew.
Tabanus ægrotus, O. S. Victoria, Wellington.
Tabanus fratellus, Will. Victoria, Pt. Renfrew.
Tabanus sequax, Will. Vancouver, Glacier.
Tabanus Sonomensis, O. S. Pt. Renfrew, Vancouver.
Tabanus comastes, Will. Agassiz.
Tabanus septentrionalis, Lw. Vancouver.
Triptotrichia discolor, Lw. Wellington.
Leptis dimidiata, Lw. Vancouver, Pt. Renfrew.
Symphoromyia latipalpus, Bigot. Victoria.
Symphoromyia Johnsoni, Coq. Victoria, Glacier, Vancouver.
Dioctria albius, Walk. Victoria.
Scleropogon modestus, Lw. Victoria, Goldstream.
Scleropogon helvolus, Lw. Victoria.
Pogonosoma dorsata, Say. Victoria.
Cyrtopogon nebulo, O. S. Vancouver, Vernon.
Cyrtopogon aurifex, O. S. Victoria.
Cyrtopogon montanus, O. S. Vernon.
Cyrtopogon positivus, O. S. Pt. Renfrew.
Laphria astur, O. S. Victoria, Goldstream.
Laphria vultur, O. S. Vancouver, Pt. Renfrew.
Rhynchocephalus Sackenii, Will. Vernon.
Anthrax agrippina, O. S. Victoria, Vancouver.
Anthrax seminigra, Lw. Victoria.
Anthrax lateralis, Say. Pt. Renfrew, Goldstream.
Anthrax sinuosa, Wied. Pt. Renfrew, Victoria.
Anthrax Harveyi, Hine. Agassiz.
Exoprosopa dorcadion, O. S. Wellington.
Spogostylum œdipus, Fabr. Victoria.
Spogostylum pauper, Lw. Victoria.
Spogostylum melanopogon, Bigot. Vancouver.
Aphœbantus hirsutus, Coq. Goldstream.
Eclimus auratus, Will. Victoria.
Bombylius major, Linn. Victoria.
Bombylius lancifer, O. S. Vernon.
Systœchus candidulus, Lw. Victoria.
Thereva frontalis, Say. Vancouver.

Pterodontia misella, O. S. Wellington.
Empis luctuosa, Kirby. Wellington.
Empis virgata, Coq. Victoria, Vancouver.
Empis poplitea, Lw. Victoria.
Empis laniventris, Esch. Glacier.
Anthalia stigmalis, Coq. Pt. Renfrew.
Dolichopus occidentalis, Ald. Vancouver.
Dolichopus plumosus, Ald. Pt. Renfrew.
Hygroceleuthus crenatus, O. S. Vancouver.
Hygroceleuthus ciliatus, Ald. Pt. Renfrew.
Hercostomus procerus, Wheeler. Pt. Renfrew.
Physocephala Burgessii, Will. Glacier.
Myopa plebeia, Will. Halzic.
Myopa clausa, Lw. Vancouver.
Zodion fulvifrons, Say. Pt. Renfrew.
Gastrophilus equi, Fabr. Vancouver.
Gymnosoma fuliginosa, R. D. Goldstream.
Alophora æneoventris, Will. Vancouver.
Eulasiona Comstockii, Towns. Pt. Renfrew.
Plagia Americana, v. d. W. Pt. Renfrew.
Arphria ocypterata, Towns. Victoria.
Ocyptera Carolinæ, R. D. Vancouver.
Ocyptera dosiades, Walker. Pt. Renfrew.
Dionæa nitoris, Coq. Victoria, Vancouver.
Panzeria ampelus, Walker. Vancouver.
Gymnochæta alcedo, Lw. Vancouver.
Exorista blanda, O. S. Vancouver.
Tachina robusta, Towns. Victoria.
Blepharipeza adusta, Lw. Victoria.
Paraphyto borealis, Coq. Glacier.
Frontina Frenchii, Will. Vancouver.
Gonia antennata, Coq. Vernon.
Gonia capitata, DeG. Vancouver.
Masicera chætoneura, Coq. Glacier.
Peleteria tessellata, Fabr. Agassiz.
Peleteria robusta, Wied. Goldstream.
Echinomyia algens, Wied. Vancouver, Victoria.

Echinomyia infumata, Bigot. Victoria.
Echinomyia decisa, Walker. Glacier.
Epalpus bicolor, Will. Vancouver.
Epalpus signifera, Walker. Vancouver, Victoria.
Bombyliomyia abrupta, B and B. Victoria.
Myiocera simplex, Bigot. Victoria.
Sarcophaga sarraceniæ, Riley. Vancouver.
Calliphora erythrocephala, Meig. Victoria.
Calliphora viridescens, R. D. Pt. Renfrew, Glacier.
Lucilia Cæsar, Linn. Vancouver.
Lucilia sericata, Meig. Wellington.
Musca domestica, Fabr. Victoria.
Pollenia rudis, Fabr. Victoria.
Mesembrina Latreillei, R. D. Vancouver, Agassiz.
Pyrellia cyanicolor, Zett. Vancouver.
Pyrellia ænea, Zett. Vancouver.
Pseudopyrellia cornicina, Fabr. Vancouver.
Limnophora alone, Walker. Vancouver, Pt. Renfrew.
Phaonia septentrionalis, Stein. Glacier, Agassiz.
Hydrotæa dentipes, Fabr. Pt. Renfrew.
Aricia serva, Meig. Glacier.
Phorbia cinerella, Fall. Field.
Hyetodesia varipes, Coq. Victoria.
Mydæa signia, Walker. Vancouver.
Scatophaga furcata, Say. Victoria.
Scatophaga stercoraria, Linn. Pt. Renfrew, Vancouver.
Neuroctena analis, Fall. Victoria, Pt. Renfrew.
Tetanocera plebeja, Lw. Field.
Œdoparea glauca, Coq. Pt. Renfrew, Vancouver.
Seoptera vibrans, Linn. Vancouver.
Tephritis albiceps, Pt. Renfrew.
Palloptera jucunda, Lw. Vernon.
Sapromyza lupulina, Fabr. Victoria, Pt. Renfrew.
Sepsis violacea, Meig. Vancouver.
Borborus geniculatus, Macq. Vancouver.

SYNOPSIS OF BEES OF OREGON, WASHINGTON, BRITISH COLUMBIA AND VANCOUVER.

BY HENRY L. VIERECK, ASSISTED BY T. D. A. COCKERELL, E. S. G. TITUS, J. C. CRAWFORD, JR., AND M. H. SWENK.

This first guide to the bees of the "Great Northwest" is presented in the hope that it will encourage the collection and study of these interesting insects in a region which is only now beginning to yield its treasures in this department of science.

The species are, in the main, arranged from generalized to specialized types; the groups follow one another, as in the recently proposed scheme of Mr. Charles Robertson, whose papers on the classification of bees have appeared, with few exceptions, in this journal.

Prof. Cockerell's published work on Nomadidæ has been drawn upon for the portion of this synopsis which relates to that family. Mr. E. S. G. Titus, Mr. J. C. Crawford and Mr. M. H. Swenk have contributed, or will contribute, respectively, the Megachilidæ, Halictidæ and Colletidæ—to all I am greatly indebted. Those papers of Robertson that have not appeared in the CANADIAN ENTOMOLOGIST have been drawn upon for the generic synopsis in Bombidæ and Andrenidæ.

– PROSOPIDÆ, Prosopis, Fabr.

Female.

Small. Entirely black; wings strongly brownish; dull, sculpture dense, disc of metathorax rugose; abdomen shining, second segment depressed about one-third, indistinctly in the middle .... *basalis.*

Prosopis basalis, Sm.—Brit. Mus. Cat. I., 23.

Vancouver. (Am. Ent. Soc. Phila.)

Males.

Scape immaculate.

Superior extensions of the lateral face-marks distinctly separated from the eyes ..... *citrinifrons.*

Superior extensions of the lateral face-marks contiguous with the eyes ..... *divergens.*

Scape maculated.

Superior extensions of the lateral face-marks shaped like commas and abruptly separated from the eye margins; abdomen dull, wings brownish ..... *Bakeri.*

Superior extensions of the lateral face-marks not shaped like commas nor abruptly separated from the eye margins; abdomen shining ..... *Mesillæ.*

Prosopis citrinifrons, Ckll., Psyche vii., Supp. p. 27.

Vancouver. ♂ (Am. Ent. Soc., Phila.) With the flagellum brown beneath.

Prosopis divergens, Ckll., Psyche vii., Supp. p. 29.

Oregon. (Am. Ent. Soc., Phila.) Differs from the description as follows: Face lemon-yellow, inclining to orange; marks on body and legs much the same; anterior tibiæ reddish (possibly coloured by cyanide); first segment of abdomen closely punctured; flagellum brown beneath; supraclypeal mark blunt, triangular; a dark spot on the yellow of the tubercles.

Prosopis Bakeri, Ckll, Psyche vii., Supp. p. 26.

Corvallis, Oregon, 25 May, 1898 (Cordley).

Prosopis Mesillæ, Ckll., CAN. ENT., xxviii., p. 42.

Washington. (Am. Ent. Soc. Phila.) Enclosure of metathorax, rather coarsely striate.

COLLETIDÆ, Colletes, Latr.

By Myron H. Swenk, Lincoln, Nebr.

Females.

Mesothorax with black hairs; abdomen highly polished, base of segment 2 fasciate ..... *fulgidus*, n. sp.

Mesothorax without black hairs.

Pubescence of head, pleura and legs black; no abdominal fasciæ ..... *Pascoensis.*

Pubescence of head, pleura and legs not black; abdomen fasciate.

Pubescence of head and thoracic dorsum fulvous; 13 mm. long ..... *Kincaidii.*

Pubescence of head and thoracic dorsum yellowish-white; 10 mm. long ..... *delodontus.*

Males.

Cheeks and tibiæ with black pubescence ..... *Pascoensis.*

Cheeks and tibiæ with pale pubescence.

Pubescence of thoracic dorsum whitish, with a few brown hairs ..... *fulgidus*, n. sp.

Pubescence of thoracic dorsum fulvous or ochraceous, without dark hairs.

Larger, 10½ mm. long ..... *Kincaidii.*

Smaller, 9 mm. long ..... *simulans.*

Colletes Pascoensis, Ckll., Proc. Acad. Nat., Sci., Phil., 1898, p. 51.
Type locality: Pasco, Wash. (Ckll.)
Colletes Kincaidii, Ckll., Proc. Acad. Nat. Sci., Phil., 1898, p. 52.
Type locality: Olympia, Wash. (Ckll.)
Colletes delodontus, Vier., Trans. Am. Ent. Soc., xxix., p. 60.
One ♀, Pasco, Wash., May 25, 1896.
Colletes simulans, Cress., Proc. Bost. Soc. Nat. Hist., xii., p. 165.
Two ♂ ♂'s, Olympia, Wash., July 4, 1896.

Colletes fulgidus, n. sp.—♀. Length, 10 mm. Black, shining. Head broad, orbit extremities bluntly rounded. Clypeus flat, shining, very coarsely striately punctured, depressed before truncate apex, with short scattered, pale hairs. Middle of supraclypeal area shining, about impunctate. Front dull, with small crowded punctures, sparsely covered with short gray pubescence. Vertex not depressed, shining, very finely and rather closely punctured, with erect pale pubescence and a few black hairs intermixed. Cheeks punctured like vertex, the pubescence short and sparse. Malar space less than one-fourth width of mandible at base. Mandibles black, the notch not far from the spatulate, rufescent tip. Labrum shining with a deep, round median pit and lateral grooves. Antennæ black, the flagellum sometimes very obscurely brownish beneath, and its basal joint a shade longer than second.

Prothoracic spine short, but stout and sharp, triangular. Mesothorax very coarsely and deeply punctured, the punctures very close but rarely cancellate, on the polished disc well separated and few, on either side a longitudinal sub-impunctate line. Scutellum hardly punctured, except along posterior margin, postscutellum dull and finely roughened. Anterior margin of thorax with a rather dense fringe of erect hairs, whitish tinged with ochraceous and mixed with black, this passing along sides within tegulæ and covering postscutellum, where the black hairs are lacking. Space within this circle of pubescence almost bare, the hairs few, scattered, bristle-like and all black, a fringe of black hairs along posterior edge of scutellum. Superior face of metathorax rather poorly defined, but a decided rim beyond postscutellum, the sub-rectangular pits well formed, shining, scarcely wider medially, about twice as long as broad. Posterior face of metathorax shining, the lateral faces with sparse, long, white pubescence and very coarsely and irregularly punctured, forming a rough surface, the enclosure funnel-shaped, its bowl ridged laterally and with a median longitudinal groove, not so polished as the

smooth neck, which is twice as long as wide at base. Mesopleura shining, coarsely and closely punctured, except for a small, median, polished, impunctate space, the pubescence whitish. Tegulæ shining, black to rufo-piceous. Wings hyaline, nervures very dark brown to blackish, stigma dark brown. Legs wholly black, claws and spurs ferruginous, thinly clothed with grayish-white pubescence, rufous fringes on inner apices of tarsal joints. Abdomen shining, first segment highly polished, its base almost impunctate and surrounded by a ruff of long, erect, pale hairs, which reaches down the sides, elsewhere with small, well-separated punctures, weakening toward a median longitudinal impunctate line and becoming finer and very dense on apical margin, second segment similar, but uniformly and more finely punctured, following segments duller, but still quite shiny, finely and closely punctured. Base of second segment depressed; and with a white pubescent fascia broadly interrupted medially, the apical margin of the first with lateral fasciæ, of 2–5 with complete broad pure white fasciæ, which are, however, not dense, but easily worn off, and not decidedly continued on the shining venter. Segments 3–6 with a few scattered, dark brown hairs.

♂.—Length 9 mm. Differing from ♀ as follows: Pubescence much paler and denser, that on clypeus long, dense and silvery, that on thorax long, erect and covering the whole surface, pale gray or grayish-white, with a very few dark brownish hairs intermixed, these most noticeable on scutellum; labrum with about four subequal striæ; first joint of flagellum a shade shorter than second; malar space about one-half width of mandible at base; prothoracic spines smaller; apical tarsal joints inclining to ferruginous; abdomen shining, but lacking the high polish of the ♀, the whole of first segment with spare, long, erect pale pubescence, no fascia on base of second segment, but a poorly-formed one at apex of first segment, and well-formed, though loose, fasciæ on apices of 2–6.

Specimens examined: Type ♀, ♂, Big Horn Mts., Wyoming (L. Bruner); co-types, 2 ♀ ♀'s, Corvallis, Oregon, June 11, 1898; 2 ♀ ♀'s, Market Lake and St. Anthony, Idaho; 2 ♀ ♀'s, Colorado, Nos. 2277 and 2294. Apparently a mountain species of rather extended distribution.

From the other North American species having black hairs on the thorax above and a fascia on base of second abdominal segment in the ♀, this sex of *fulgidus* may very readily be distinguished as follows: From *compactus* by the pitted base of metathorax; from *distinctus* by the

densely-punctured and sparsely pubescent mesothorax; from *Gilensis* by its much smaller size; from *nudus* by the polished and more closely-punctured abdomen, and pale hairs on vertex; from *bigeloviæ* by the clear wings; and from *armatus* by its smaller size, darker flagellum and tegulæ, and more shining abdomen and legs.

XYLOCOPIDÆ, Xylocopa.

Female. 17 mm.

Entirely black; wings pale brown; dorsum shining; middle of dorsulum impunctate; abdomen with the punctures irregularly distributed, at no place far apart.....*orpifex.*

Xylocopa orpifex, Sm., Trans. Ent. Soc., Lond., 1874, p. 298.

Riddle, 4th July, and Corvallis, 10th Oct., 13th Dec., Oregon. (Cordley.)

BOMBIDÆ.

Ocelli large; ♀ with the ocelli below supraorbital line, in the narrowest part of the front, distance between lateral ocelli greater than the distance between the lateral ocellus and the eye. ♂ with the ocelli frontal, the lateral one less than its diameter from the eye, malar space much shorter than wide.....*Bombias.*

Ocelli small; ♀ with the ocelli near the supraorbital line, above the narrowest part of the front, the distance between lateral ocelli about equal to the distance between the lateral ocellus and the eye. ♂ with the ocelli vertical, the distance between the lateral ocelli and between them and the eye as in the ♀, malar space about as long as wide.....*Bombus.*

BOMBIAS, Robt.

Pubescence of head black, in the male pale; dorsum of thorax, pleura, first dorsal segment entirely, second segment partly, with pale ochreous pubescence.....*separatus.*

Bombias separatus, Cress., Proc. Ent. Soc., Phil., ii., p. 165. Taken at Corvallis, Oregon, by Prof. Cordley, as follows: ♀♀'s, 21st May, 1899; 1st June, 1898; 4th October, 1899. ♂♂'s, 24th April, 1899; 2nd and 20th September, 3rd October, 5th November, 1899.

BOMBUS, Latr.

Pubescence of first three dorsal segments of abdomen pale.....1.

Pubescence of first three dorsal segments of abdomen various, at least one of the segments black, or partly black.....4.

1. Pale pubescence of abdomen ochreous.....2.
Pale pubescence of abdomen at least partly reddish.....3.
2. Dorsum of thorax entirely pale.....*Morrisonii.*
Dorsum of thorax black in the centre.....*Nevadensis.*
Dorsum of thorax with a black band.
Face with black pubescence, ♀ with two apical segments black.....*Pennsylvanicus (=fervidus.)*
Face with pale pubescence, ♀ with the apical segment black.....*appositus.*
3. Dorsulum not banded, pale and black hairs mixed.....*melanopygus.*
Dorsulum banded; second and third segments of abdomen distinctly reddish.
Scutellum entirely pale.....*ternarius.*
Scutellum partly black.....*bifarius.*
Third and fourth abdominal segments indistinctly reddish.....*Vancouverensis.*
4. Apex of abdomen pale.....5.
Apex of abdomen largely black.....6.
5. First abdominal segment black.....*occidentalis.*
First abdominal segment pale, or with some black.
Last three segments pale yellowish.....*mixtuosus.*
Last three segments pale white and yellow, or white and tawny.....*Oregonensis.*
First abdominal segment with some black.
Last three segments pale and black and brownish at apex.....*Putnamii.*
First abdominal segment without black.....*Sitkensis.*
6. First segment black.....*Californicus.*
First segment pale.....*Edwardsii.*
First segment black only at base.....*Americanorum.*

Bombus Morrisonii, Cress., Proc. Acad. Nat. Sci., Phil., 1878, p. 183.
One ♀ (without data) received from Prof. Cordley.

Bombus Nevadensis, Cress., Trans., Am. Ent. Soc., Phil., v., p. 102.
Females, Condon, Oregon, 8th and 23rd July. (Cordley.)

Bombus Pennsylvanicus, De Geer, =*fervidus*, Fabr.
B. (Apis) Pennsylvanicus, De Geer, Mem. Hist. Insect. iii., 1773, p. 575.
B. (Apis) fervida, Fabr., Supp. Entom. System., 1798, p. 274.

One ♀ 23rd July, 1899, ☿'s 23rd July, 1899, Condon, Oregon; ♂'s 26th July, 1897, 8th Sept., 1899. (Cordley.)

Bombus appositus, Cress., Proc. Acad. Nat. Sci., Phil., 1878, p. 183.

♀'s 11th June, 1897, September, 1899, Corvallis (Cordley), ♂'s 5th July, 1900, Hillsboro (Tulley), 13th July, 1900, Amity (Smith), 11th Aug., 1899, Corvallis (Cordley), Oregon.

Bombus melanopygus, Nyl. Notis. Saellsk. Faun. and Fl. Fenn. Forh. i., 1848, p. 236.

♀'s 4th May, 1897, 11th, 14th May, 1898, Corvallis, Oregon (Cordley.) Mt. Hood, Oregon; Vancouver (Am. Ent. Soc., Phil.).

Bombus mixtuosus, Ashm., Proc. Wash. Acad. Sci., iv., p. 128.

1st May, 1903, Vancouver, B. C. (Harvey.)

Bombus Sitkensis, Nyl., Notis. Saellsk. Faun. and Fl. Fenn. Forh. i., p. 235.

2nd June, 1902, Vancouver, B. C. (Harvey.)

Bombus ternarius, Say, Bost. Journ. Nat. Hist., i., p. 414.

☿'s, Condon, 14th July, 1900 (Tulley), Corvallis, 14th July, 1900 (Tulley), 14th Aug., 1900 (Tulley), Corvallis, Oregon.

Bombus bifarius, Cress., Proc. Acad. Nat. Sci., Phil., 1878, p. 185.

Washington, Vancouver, British Columbia. (Am. Ent. Soc., Phila.).

This is undoubtedly a variety of *ternarius*.

Bombus Vancouverensis, Cress., Proc. Acad. Nat. Sci., Phil., 1878, p. 187

Vancouver. (Am. Ent. Soc., Phila.)

Bombus occidentalis, Greene, Ann. Lyc. Nat. Hist., New York, vii., 1858, p. 12.

♀'s, Corvallis, 9th, 14th and 20th May, 1898; 4th May, 7th June, 1899, 1900; ☿'s, 11th May, 28th May, 1898 (Cordley.) Washington; Mt. Hood, Oregon; Vancouver. (Am. Ent. Soc., Phil.) Rated as a variety of *terricola* by Handlirsch.

Bombus Oregonensis, Cress., Proc. Acad. Nat. Sci., Phil., 1878, p. 185.

♀'s, 5th, 19th April, 3rd, 7th, 9th, 15th, 25th, 26th May, 1898; 30th April, 1899; ☿ 22nd April, 10th, 14th, 15th, 25th, 28th May, 2nd, 6th, 7th, 10th June, 1898; ♂'s, 1st May, 1899; 22nd, 29th May, 1897; 11th June, 1897; 5th June, 1897; 1st June, 1898; 17th Aug., 1899; all Corvallis (Cordley). Vancouver 16th, 30th May, 1903, ☿'s

Bombus Putnami, Cress., Proc. Acad. Nat. Sci., Phil., 1878, p. 185.

Washington; Mt. Hood, Oregon (Am. Ent. Soc., Phila.).

Bombus Californicus, Sm., Cat. Hym. Brit. Mus., ii., 1854, p. 400.

♀'s, 15th, 21st, 23rd, 29th May, 1899; 4th, 10th June, 1898; 18th

Sept., 1899; ♂'s, 20th June, 23rd Sept., 1899; 27th Sept., 3rd Oct., 1899; 7th, 9th Oct., 3rd Nov., all Corvallis. Oregon (Cordley), Mt. Hood, Oregon; Vancouver; Washington (Am. Ent. Soc., Phila.), 28th June, 1902, Vancouver, B. C. (Harvey).

Bombus Edwardsii, Cress., Proc. Acad. Nat. Sci. Phil., 1878, p. 184.

Washington; Vancouver; British Columbia; Ft. McLeod, Aug., 1882. (Am. Ent. Soc., Phila.)

Bombus Americanorum, Fabr., Syst. Entom., 1775, p. 380.

One ♀ without data, received from Prof. Cordley.

PSITHYRUS, Lep.

Psythyrus insularis, Sm.

Head above and dorsum of thorax covered with pale pubescence, which extends down on the pleura. A band of black hairs reaching from wing to wing. Abdomen, in the ♀, black sides of apical half yellow; ♂ with pale pubescence except on apical third, where it is black.

♀ 4th June, 1898, Corvallis (Cordley), with posterior ⅔ of dorsum of thorax black; ♀ 1st April, 1902, Vancouver, British Columbia (Harvey); ♂ 28th June, 1902, Vancouver, B. C. (Harvey); ♂ Mt. Cheam, B. C., Aug., 1903 (Harvey).

SPINNING METHODS OF TELEA POLYPHEMUS.

In the CANADIAN ENTOMOLOGIST for May, 1903, page 139, Mr. J. W. Cockle, of Kaslo, B. C., stated that he had found a number of cocoons of *T. polyphemus* suspended to the twigs of trees by a silken band, after the manner of Promethea, and expressed the view that this peculiarity might only apply to Western America.

He has now sent us a letter from Mr. Edward Denny, of Montreal, who says that he has collected Polyphemus cocoons for several years, and has taken as many as 400 in one season; that he has found them lying loose upon the ground, and also as high as fifteen feet from the ground, with the leaf spun firmly to the twig. "The method of attaching the leaf to the twig seems to prevail in this district, 19 out of 20 being of this character, but, strange to say, this year they seem to prefer the grass, or content themselves with spinning their cocoons on the ground."

Mr. Cockle suggests that as "the continuous wet, snow and rain in the west would undoubtedly be detrimental to the life of the pupa if it remained upon the ground all winter, so we find them suspending themselves from the limbs of trees; whereas, in Montreal the extremely hard and cold winter seems to afford a reason why the pupa should have the protection of a heavy covering of snow." [We have never found a Polyphemus cocoon suspended by a silken band; when attached to a twig or bough it has always been by the side.—ED. C. E.]

THREE NEW ICHNEUMON FLIES FROM RUSSIA.

BY WILLIAM H. ASHMEAD, M.A., D.SC, WASHINGTON, D. C.

Mr. Jacob Schreiner, of St. Petersburg, Russia, has been sending me for names some of his rearings of parasitic Hymenoptera, among which are many interesting species.

In his last sending were *three* which are apparently undescribed, and as they are of great economic importance I submit the following descriptions:

Genus PRISTOMERUS, Holmgren.

Pristomerus Schreineri, new species.—♀. Length, 7.8 mm.; ovipositor almost as long as the abdomen. Black, the abdomen with the venter, the dorsal segments 3 to 6, except the third basally, and the legs, including all coxæ, pale ferruginous, the hind tibiæ at apex narrowly fuscous; antennæ black, with the first three joints, except the apex of the third, honey-yellow; wings hyaline, the stigma reddish-brown, the veins blackish, the tegulæ yellowish. The head and thorax are very finely punctate, slightly shining, the metathorax rugulose and distinctly areolated; the abdomen is smooth, but with the first and second segments and the base of the third segment delicately, but distinctly, longitudinally striated.

♂.—Length, 6.5 to 7.5 mm. Agrees well with the female, except that the ventral segments, except the first and the second, the sutures of the following, and the dorsal segments, except the apex of the second, the third entirely, and the fourth and fifth laterally, are black.

Type.—Cat. No. 7778, U. S. N. M.

St. Petersburg, Russia. Described from 1 ♀ and 2 ♂ specimens, bred by Mr. Jacob Schreiner from the larvæ of *Plutella cruciferarum*, Zeller.

Genus TEMELUCHA, Forster.

Temelucha plutellæ, new species.—♀. Length, 7.5 mm.; ovipositor a little shorter than the abdomen. Black, the orbits broadly, the cheeks, the face below the insertion of the antennæ, except the sutures of the clypeus, the scape of the antennæ beneath, the upper margin of the prothorax and the lateral angles to the tegulæ, a VV-shaped mark on the mesonotum, the scutellum entirely, a broad band and a rounded spot on the mesopleura, a spot back of the insertion of the hind wings, a stripe on the metapleura, a band above this stripe and connected with a transverse band near the apex of the metathorax, yellow; the tegulæ, the front and middle legs, a spot at apex of hind coxæ, and the apex of the hind

trochanters, pale yellowish; the middle and hind coxæ have a black spot at base, the hind legs, except as noted, being ferruginous, the tips of the tibiæ, tips of the first and second joints, and the fifth joint of tarsi, fuscous, the tibial spurs white; the abdomen, except the apex of the first and the second dorsal segments, and some marks on the venter and laterally on segments 3 to 7, is black, the apex of first and second dorsal segments and marks on segments 3 to 7 are ferruginous; the ventral segments 2 and 3, except a quadrate black spot at base of the third, are yellowish-white. Wings hyaline, the stigma and veins rufo-testaceous.

Type.—Cat. No. 7779, U. S. N. M.

St. Petersburg, Russia. Described from a single ♀, bred by Mr. Jacob Schreiner from the larva of *Plutella cruciferarum*, Zeller.

This is the first European species to be described in this genus, although I suspect, just as is the case in America, that other species are described under the genus *Cremastus*.

Genus EPIURUS, Forster.

Epiurus carpocapsæ, new species.—♀. Length, 6 mm.; ovipositor about 2 mm. Head, the prothorax, except the upper hind angles, and the first abdominal segment towards base, black, rest of thorax and the abdomen rufo-testaceous; antennæ and legs, except as noted, pale ferruginous, the base and apex of hind tibiæ and the tips of the joints of the hind tarsi, black, the rest of the hind tibiæ, between the black annuli at base and apex, and the tarsi, white. Wings hyaline, the stigma and veins reddish-brown.

Type.—Cat. No. 7780, U. S. N. M.

St. Petersburg, Russia. Described from a single ♀, bred by Mr. Jacob Schreiner from *Carpocapsa pomonella*, Linné.

This species is evidently allied to *Pimpla diluta*, Ratzeb., which should be relegated to this genus.

The hosts of these parasites are widely distributed in North America, and do considerable damage, so that these parasites discovered by Mr. Schreiner should be introduced into our fauna to aid in destroying these pests of the cabbage and apple.

CORRECTION OF NAME.

Prof. Cockerell writes me that the name *Noctua umbrosa* has been used previously (Newman, British Moths, p. 352), and that my species of that name (CAN. ENT., XXXVI., 31, 1904) will have to be changed. I therefore propose that it be called *perumbrosa*. HARRISON G. DYAR.

LIFE-HISTORY OF SABULODES ARCASARIA, WLK.

(Sabulodes arcasaria, Wlk., ♂. Sabulodes sulphurata, Pack., ♀.)

BY OTTO SEIFERT, NEW YORK.

On April 24th two ♀ ♀ of this moth were found resting on the ground within a cluster of Sumach-brush, at Woodside, Long Island, N. Y. Their bright yellow colour had faded to pale ochre.

Eggs were deposited from April 24th to 28th, only during the night. According to circumstances they are secreted within the fissures of the leaf-buds and narrow crevices of bark, or into the folds of decaying leaves of the food-plant. In the first case the nearly elliptical eggs are fastened erect, close together, in a single row; when attached to a broader surface they are arranged in small regular patches or rows, but deposited lengthwise, the next one always overlapping the preceding one with its blunt, micropylar end.

At first the eggs are pale grass-green, rather bright, turning soon to brown and bright purplish-brown; towards maturity they contract, forming a shallow cavity on the surface, and revealing the dark-coloured embryo within the colourless membrane.

All the larvæ left their egg-shells by May 9th, collecting gregariously during the daytime on the under side of the leaves, hanging down perpendicularly. The slender, smooth larvæ are purplish-violet to purplish-brown above and below, stigmatal region white. In general they retain this colour to maturity, changing not more than to adapt themselves to the brighter or duller appearance of the maturing or decaying leaflet stems.

The larvæ grow rapidly, moulting during the night; they eat their thrown-off skin, only leaving the covering of anal legs and adjoining parts. Full-grown, they reach a length of 3.5 to 5.0 centim., and attain, by the gradually more pronounced whitish irregular lines and dots upon the dark ground-colour, the appearance of a withered branchlet.

At maturity the larva draws one or more leaves together with the help of a few white silky spinnings, and contracting itself considerably, changes within a few hours to a slender, light brownish-yellow or deep tan-coloured, finely-speckled pupa, transforming into imago within two or three weeks.

Eggs deposited April 24th to 28th hatched May 7th to 9th; larvæ pupated from June 2nd to 7th, imagoes appeared from June 17th to 30th. A ♂ and ♀ of this brood were paired; the ♀ deposited eggs to June

28th ; eggs hatched July 2nd ; larvæ transformed July 24th to 28th ; final metamorphosis Aug. 7th to 19th.

Near New York City probably three broods during a season are the rule for this species ; of the last generation apparently only the gravid ♀ ♀ hibernate ; since more ♀ ♀ of faded appearance, and almost destitute of eggs, were taken during the first days of May within the Sumach-brush, on the hills near Patterson, N. J. Of the European Geometridæ only ½ p.c. hibernate in the imago state (Wemsburg).

The preferred food-plant seems to be *Rhus glabra*, though the larvæ also feed on *Rhus hirta* and *R. copallina*, with the changeable leaves of which the bright colours of the moth perfectly harmonize ; these often rest in the manner of butterflies, with the wings meeting perpendicularly over the back.

All the ♂ ♂ of the two broods were *Sabulodes arcasaria*, Wlk., and all the ♀ ♀ *S. sulphurata*, Pack., with no intermediate forms.

The description of ♂ and ♀ in Packard's Monograph is exhaustive, and it may only be added that the first generation of the ♂ ♂ has the yellow basal part of the wings often very prominently variegated by brown irrorations, the basal line becoming very conspicuous ; while the July brood has the yellow space mostly plain, even the basal line being often wanting. The extension of the brown outer part of the wings is variable, often covering, especially on secondaries, the larger part of the wings. With many specimens the brown is more or less clouded by yellow towards the basal part.

The ♀ ♀ seem less inclined to variation, but with a few the whole space beyond the indicated outer line is of a delicate pale ochre.

The difference in size is very considerable, as might be expected from the appearance of the mature larvæ ; the specimens measure across the wings : ♂ ♂ from 3.0 to 3.9 centim. ; ♀ ♀ from 3.3 to 4.49 cen.

The eggs are nearly elliptical, finely punctured except the smooth, more rounded micropylar end, which is ornamented with rather large, elongated cells. Longest diameter 0.65 millim.

The newly-hatched larvæ are very slender, cylindrical and smooth to longitudinal fold, only first segment slightly enlarged. The head at this stage is considerably wider than the body, rounded above, flat in front, not specialized, rather smooth, of a deep tan colour, with darker ocelli.

Dorsal, lateral and ventral region purplish-violet to purplish-brown; stigmatal area white; warts very minute, with blackish points emitting a single short black hair.

The changes the larvæ gradually undergo up to their last stage are rather limited; their skin turns wrinkled by numerous transverse folds, the whole stigmatal area gets greatly reduced and obscured by many irregular purplish-brown length-lines. The head and first segment become adjusted to nearly the same width, though they are perceptibly narrower than second somite, from which the body slowly gains towards the last two segments, which appear abruptly widened.

The majority of the full-grown larvæ measured 4.5 centim., width of head 2.15 millim.; they are widest at the last four somites, where they measure about ½ centim., tapering gradually towards second somite. The head and first segment are of almost the same width, and rather abruptly set off, anal legs very much developed, and provided with moderately long spurs, which bear a single short bristle.

Head nearly smooth, rounded above, flat in front, of the same light brown colour as cervical shield, whose dark brown lateral bands extend over the cheeks, terminating wedge-like near the white-tipped antennæ.

From second to last somite the colour of the larvæ is almost uniformly purplish-brown, variegated by fine, often interrupted, whitish lines and irrorations, which are most prominent on posterior part of somites. Fourth and fifth segments have anteriorly a black patch, extending from longitudinal fold to lateral space. Ventrally the whitish lines and irrorations mostly prevail, giving this area often a nearly grayish appearance.

Tubercles small, dark brown, conical, pointed, with a short single hair; wart ii. more developed on 7th and 8th somite, but not exceeding in height 0.5 mm.

On second segment the prominent longitudinal fold has the tubercles within its sphere enlarged and rounded, thus obtaining almost the appearance of an excrescence.

The slender pupæ vary considerably in size and colour, measuring from the slightly protruding head to cremaster from 1.5 to 2.0 centim., width of 5th abdominal somite from 5.5 to 7.5 mm. They are finely but very profusely, granular and wrinkled, especially the wing-covers, thorax and sheaths of limbs. The strong, rugose, flat and pointed cremaster ends with two slender hooks and six smaller capitate ones at the edges.

The colour of the pupæ varies from tan colour to a warm light brownish-yellow, sprinkled with numerous blackish atoms; wing-covers, thorax and limbs of slightly paler colour than abdomen. Stigmata brown, also the tubercles of the larva indicated by larger brown dots. An often obscured or obsolete blackish stripe at the middle of abdomen above and below.

TORYMUS THOMSONI, N. SP.

BY REV. THOMAS W. FYLES, LEVIS, QUEBEC.

In the first week of July my attention was drawn by my friend, Mr. Joshua Thomson, of Levis, to a strange sight. The plum trees in his grounds were infested with myriads of a new species of Torymus, as many as thirty of the insects appearing on one plum. I never witnessed anything in my entomological pursuits more remarkable. The brilliant little creatures could be seen in the act of depositing their eggs; their ovipositors thrust deep into the fruit. Some of the plums attacked showed signs of a previous attack of the Curculio, but most of them did not. Whether the larvæ of the species feed on the flesh and juices of the plum or attack the grubs of the Curculio, I cannot say, for I was unable to follow the life-history of the species. The following is a description of the fly:

Body a brilliant metallic green. Thorax punctate; prothorax rounded; metathorax large and elevated; scutellum arched. Trochanters and femora of the same colour as the body, the rest of the legs cærate; tibiæ spurred; tarsi five-jointed, the two last joints somewhat darkened. The antennæ brown, clavate; scape rather long; club three-jointed. Eyes oval, large and full, of a warm purple, with a pale rim, and set with short hairs; ocelli purple. Wings with short ciliæ, iridescent; vein of fore-wing widened where it bends to the costa and for the rest of its length, bristly; the stigmal vein knobbed. Plates above and below the insertion of the wings purple. Ovipositor dark brown, stout, as long as the body. Total length of the insect, 3 mm.

Mr. Ashmead says that the species is "quite different from *T. Sackenii*, or anything else in our collection."

I have sent types of the species to the U. S. National Museum. I may add that all the fruit attacked by the insect fell to the ground. I have named the species after Mr. Thomson, who drew my attention to it.

A NEW MANTIS OF THE GENUS STAGMATOPTERA FROM NICARAGUA.

BY JAMES A. G. REHN, PHILADELPHIA, PA.

Stagmatoptera typhon, n. sp.—Type, ♀; San Marcos, Nicaragua (Baker). Acad. Nat. Sci., Phila.

Allied to *sancta* and *birivia*, Stoll., and *insatiabilis*, Rehn. From the *sancta-insatiabilis* type it differs in the shorter and broader tegmina and wings, the wider and more rotundate expansion of the pronotum, the deeper head and slenderer anterior femora. From the *birivia* type it can easily be distinguished by the extremely short and broad wings and tegmina, the more arcuate expansions and more compressed shaft of the pronotum, as well as the absence of distinct maculations on the tegmina.

Size large; form robust. Head with the anterior aspect trigonal, about three-fourths as deep as broad; superior margin very slightly arcuate; facial shield transverse, almost twice as broad as high; superior margin very obtuse-angulate, the point of the angle depressed; eyes prominent, rounded, sub-pyriform in basal outline; antennæ very small, but slightly more than half the length of pronotum, filiform. Pronotum with the expansion moderately inflated, gradually curving anteriorly to the rather narrowly-rounded anterior margin, curving rather sharply posteriorly to the compressed, trigonal shaft; shaft with the compressed portion about equal to half the entire length of the pronotum, margins slightly expanding posteriorly; posterior margin rounded; median carina distinct on the posterior portion of the shaft, gradually becoming lower anteriorly, until on the collar it is represented by a distinct sulcus; margins of the anterior portion of the dilation with distinct but low teeth, which gradually decrease in size posteriorly, until on the posterior portion of the shaft they are obsolete. Tegmina coriaceous, short and broad, the greatest width being about one-half the length; costal margin straight, except the basal swell and a very slight median sinuosity; posterior margin very broadly and gently arcuate; apex very blunt, broadly rounded, the posterior curve more arcuate than the anterior; costal field broad, equal to one-third the median width of the wing; stigma small, longitudinal, fusiform. Wings very broad, but slightly narrower than long, posterior and apical margins of the wing evenly arcuate, except for a slight emargination separating the radial portion of the wing. Abdomen

broad, depressed. Supra-anal plate narrow, distinctly transverse, apical margin very broadly obtuse-angulate. Cerci simple, moniliform, about equal to the apex of the subgenital plate when extended. Subgenital plate rather large, trigonal, the median portion with the usual rostrate protrusion. Anterior coxæ two-thirds the length of the pronotum, lower margin being a continuous series of regularly disposed spines of two alternating sizes; femora considerably exceeding the coxæ in length, robust, anterior portion of the external margin bearing four large spines, anterior portion of the internal margin bearing fifteen spines, several of which exceed the others in length, and give a formula (reading from the distal extremity) of IıIıIıIıIıIıIı, discoidal spines four in number, posterior portion of the lower face of the femora with a series of small denticles; tibiæ slightly more than half the length of the femora, external margin with ten or eleven spines, internal margin with fourteen spines, the spines on both margins increasing in size toward the distal extremity; metatarsi slightly less than half as long again as the remaining tarsal joints. Median and posterior limbs moderately slender, the metatarsi of the median limbs considerably, and of the posterior limbs slightly, shorter than the remaining tarsal joints.

General colour pale apple-green, touched with pale yellowish on the pronotum and apex of the tegmina; eyes blackish-chocolate; stigma of tegmina pale yellow; wings hyaline, with numerous transverse tessellations of yellowish-green.

MEASUREMENTS:

Total length	64.	mm.
Width of head	9.6	"
Length of pronotum	26.	"
Greatest width of pronotum	7.3	"
Least width of pronotum	3.5	"
Length of tegmina	34.	"
Greatest width of tegmina	17.	"
Length of wings	28.3	"
Length of anterior femora	21.	"

This specimen was forwarded for determination by Prof. C. F. Baker, of Pomona College, Claremont, California. It is such a striking and unique form that comparison with the other species of the genus is hardly necessary.

NEW TORTRICIDS FROM KASLO, B. C., AND THE NORTHWEST.

BY W. D. KEARFOTT, MONTCLAIR, N. J.

Through the courtesy of Dr. Harrison G. Dyar I have had the privilege of examining and assisting in the identification of all the specimens of the family *Tortricidæ* collected and bred by him and his assistants during the past summer at and in the vicinity of Kaslo, B. C. A complete list of all species will be included in Dr. Dyar's comprehensive paper on his summer's work, which is in course of preparation. All of the species that appear to be unknown are described in the following paper. Prof. C. H. Fernald has very kindly read over the MSS. and examined the types, and confirmed my generic determinations, and in the case of one species made a correction, for all of which I am glad to acknowledge my obligation.

Cydia arctostaphylana, sp. nov.—Head, palpi, thorax and fore wings magenta, thickly sprinkled with grey, the latter predominating on inner side of palpi. The grey and magenta scales alternate along inner two-thirds of costa. Cilia of fore wing magenta inwardly margined by a delicate line of grey scales. Hing wing light shining fuscous, cilia same. Under side fore wing dark, smoky fuscous. Six or seven pale spots on costa, in each of which are a pair of dark brown costal spots. Cilia dark shining grey, tips magenta. Under side hind wing dark fuscous, with a row of whitish spots on costa. A small black crescent margining apex, and a series of faint, darker fuscous lines paralleling outer margin on outer half. Cilia light shining grey, inwardly outlined by a row of darker fuscous scales. Abdomen light fuscous, anal tuft tinged with brown; under side darker fuscous, with shades of magenta. Legs grey, outside and tibiæ shaded with magenta.

Var. A.—Ground colour nearly same as above, but more of a coppery-magenta. Palpi, only magenta on outside, upper edges and inner sides grey. Head grey, with only a trace of magenta. Thorax magenta. Fore wing: grey scales, mixed with black, almost entirely hide the magenta on the dorsal margin; a darker shade in the anal angle, and a narrow band of nearly black scales, sprinkled with grey, outline the cilia along the outer margin before this; at and above anal angle are a few dark brown scales, overlapping the dark line; along the costal are a number of whitish or light grey spots, alternating with dark brown. Cilia dark smoky-grey, sprinkled with a very few light grey specks.

Var. B.—Ground colour same as last two, but the dorsal band of Var. A in Var. B is a broad band, one-third width of wing, of whitish scales, interrupted and mixed with black, the outer and costal margin are the same, but narrower, leaving the ground colour in only the middle of the wing, forming a broad band from base to just before outer margin. Palpi dull black, tips of scales greyish-black, sprinkled with lighter; under side grey. Head dark fuscous, scales very long, projecting well above and in front of eyes in the form of ruffs. Thorax and patagia the same, but more mottled with lighter fuscous shades. Fore wing magenta, well sprinkled with whitish scales, these are more concentrated at outer third, below costa, and at apex shading into and obliterated by whitish and brownish fuscous scales. Costa from base to apex, alternate short patches of blackish-brown and whitish scales; this line is only on costal nervule. Scales on dorsal margin, whitish or very pale grey, forming a band extending upwards one-third width of wing; upper margin irregular, well defined and not gradually shading into ground colour. A conspicuous dark brown spot at inner and outer third on upper edge of this band, and a number of small spots of same colour touching dorsum, and three small patches between the inner large patch and base; other small patches of dark brown occur, making it appear mottled. Before outer margin ground colour shades into light grey and fuscous, the latter forming a narrow line, succeeded by a paler one, and beyond this another dark line just before cilia. The latter is dark fuscous, mottled with lighter dots, and at anal angle pale fuscous.

Described from 13 specimens. Seven nearly immaculate, and three each like varieties A and B. Alar Exp., 17 to 18 mm.

Bred by Dr. Dyar, Kaslo, B. C., on *Arctostaphyla* sp., and collected Platte Canon, Col., Aug. 24 to Sept. 11. U. S. Nat. Mus., Type No. 7786.

Cydia pseudotsugana, sp. nov.—Head fawn colour, the scales standing separately, and giving speckled appearance, by darker shades at their bases; face darker. Palpi, fawn colour inside and at base outside shading into dark brown; terminal joint bare, projecting its full length beyond tuft of second joint, blackish-brown, a dot of fawn on extreme tip. Thorax and patagia same as head, very dark brown beneath, irrorated with fawn-colour tips of scales. Fore wing, shades of whitish grey, fuscous and black. The basal patch occupies a little more than one-third the length of wing on the median line, angling sharply inwards to costa and dorsal margin, both of which it reaches at the inner fourth. Ground

colour greyish white, almost evenly spread dark brown and black, the dark colour is concentrated in three dots on fold, the middle one extending in a line nearly to dorsum, and beyond these a dark oblique line, defining the basal patch to median line, thence abruptly angling inward nearly to, but not reaching, dorsum. A small dark dot on costa between this line and base ; on lower half are scattered light brown scales. A dark broad band begins on costa, just beyond middle, as a small dot, but broadens just below costa and ends on dorsum before anal angle. The inner and outer edges of this band are irregular, with three distinct rounded projections on the outer and the same number of rectangular projections on the inner edges. Scattered over this band are a few whitish and reddish-brown scales, the former predominating above and the latter beneath the median line. Between this band and the basal patch the colour is more whitish than basal patch, appearing as a paler band, interrupted by a concentration of dark scales, forming a short horizontal line about a third below the costa, and a dark dash on costa in centre of light area ; a broader band of darker scales begins about median line and proceeds obliquely inwards towards, but not quite reaching, costa. The lower half of this light area is a conspicuous patch of almost white scales, in the centre of which is a small patch of light brown. Beyond the central dark fascia the ground colour as light as between basal patch and dark fascia ; a conspicuous rounded subapical patch of dark scales defines the pale area and causes the latter to appear as a whitish band from costa to anal angle. On the costa are four evenly-spaced dark dots, the inner in the centre of the whitish fascia, the outer on the apex, and the one before the apical spot is confluent with the subapical dark patch. On both the pale area and dark patches are scattered light brown scales ; a line of almost black scales precedes the dark lead-coloured cilia. Hind wing smoky-fuscous, under side same, but darker on fore wing, the costa of latter marked with geminate whitish dots, continuing over from the upper side. Abdomen grey, paler beneath ; legs same as under side of abdomen, shaded with fuscous and annulated with dark brown. In some specimens the light brown scales are missing, this may be due to rubbing, as these scales seem to be longer and less firmly rooted, but they are not long or erect enough to be classed as raised scales. Alar Exp., 17 mm.

Twenty-three specimens, collected by Dr. Dyar at Kaslo and Kokanee Mt., and taken torpid on the snow of Kitchener Glacier about

Aug. 10; also bred by him from larvæ taken June 24 on *Pseudotsuga* sp. U. S. Nat. Mus. Type No. 7788.

Proteopteryx Columbia, sp. nov.—Head clothed with long brown scales. Palpi same colour, paler beneath and inside, point of apical joint fuscous, scarcely projecting beyond tuft of second joint. Thorax, closely appressed smoky-black scales, very minutely sprinkled with brown. Patagia same, tips of scales light fuscous. Fore wing, greyish fuscous, marked with black streaks and dots and heavily overlaid, especially on lower half, with reddish-brown scales of several shades. Basal patch not distinctly defined, costal fold one-quarter length of wing, mottled grey, black and pale reddish-brown. Beyond fold on costa are five large oblique dashes, between each is a smaller dot, all black, but bordered by bright reddish-brown scales, between these dots and dashes the scales are nearly white, the outer dash is on the apex; below the third and fourth dashes is an irregular short horizontal black streak, divided into two fine lines at its outer end by a concentration of bright reddish-brown scales, the latter scales form a ?-shaped mark, with the upper edge of the rounded part bordering the black streak, the upper point running into outer margin and the lower point nearly to anal angle. A larger, somewhat oblique horizontal streak begins just beyond middle of wing, and ends beyond end of cell, a few reddish-brown scales are sprinkled over it, below it and reaching to dorsal margin is a large, roughly-triangular patch of mixed pale brown and reddish brown; this colour continues on dorsum to anal angle, but before reaching it and defining an ocellic spot the brown scales project upwards and merge into a small black dentate streak. The scales on the outer half of wing, between these black and brown patches, have a very pale bluish-white appearance. The lower and inner quarter of wing is heavily overlaid with brown scales, a shade darker than the brown dorsal patch, into which they merge. The extreme dorsal margin is dotted with black. There is a broad outer marginal line of evenly-mixed fuscous, gray and brown scales, this line bends sharply outwards above the marginal notch, which is opposite 3, 4 and 5. Cilia brownish-fuscous, long, a few long scales of black at lower end, inside anal angle. Hind wing smoky fuscous, darkest on apex. Cilia a shade lighter, under side same, but slightly paler. Under side fore wing dark smoky fuscous, darkest at apex, five white dots on costa, each enclosing a smaller black dot. Abdomen grey, anal tuft light brown. Legs light grey, tinged with pale brown.

In another specimen the pattern is the same as the above, but the ground colour is more uniformly a bright or steely grey ; the brown scales are nearly entirely absent, and the clothing of the head and palpi is almost white, but faintly tinged with yellowish-brown or very pale fawn. On the thorax of this specimen are three small pure white dots, one on each side, the result of the extreme ends of the scales of the patagia being white, and one on posterior edge, caused by the tips of the thoracic scales, which partly overlap first abdominal segment, being white.

In another specimen the reddish-brown scales cover nearly all of the lower half of the fore wing, and in other specimens these scales are coppery-brown, and in others pale brown or fawn colour. The species seems to be quite variable, but a fairly constant characteristic of all that I group under the name *Columbia* is the pair of black patches on the outer half of fore wing, one before apex, parallel to and just below costa, and a larger one also parallel to costa, but on a lower level, covering end of cell. These two streaks, with the smaller one on the apex, make three steps, each nearly an equal height above the other.

Besides the above there are two very differently marked varieties which show no intergrades, and are entitled to varietal names ; they may possibly be distinct species, as Dr. Dyar's breeding records of this group are not entirely satisfactory to him.

Proteopteryx Columbia, var. *albidorsana*, var. nov.—Head well clothed with long smoky-black scales. Palpi fawn colour, speckled with blackish, the latter predominating on end of tuft, and paler fawn on inside. Thorax black, with a few very minute brown specks. Fore wing dark chocolate-brown ; basal patch smoky-black, about half length of costal fold, convex outwardly. On the dorsum, defined on the inside by the basal patch, is a broad white band, the upper edge is excavated deeply just beyond its inner end by the ground colour, beyond this it extends upwards to a sharp point at about the middle of the cell, thence curving downward and again upward, terminating in a sharp point on middle of wing, just beyond end of cell ; the ground colour below this forms a triangular patch on dorsum, just before anal ocellic spot, the base of the triangle rests on dorsal margin at and before anal angle, but leaves margin and indents white area, causing the latter to terminate outwardly in two points. The ocellic spot is a hemispherical patch of these same white scales, but a shade less white.

In other specimens the white dorsal area is replaced by fawn-coloured scales. On the costa, beyond the fold, are five pairs of greyish-blue

oblique streaks, lightest on the costa. A streak of black begins on apex, and proceeds parallel to costa to about middle of cell, interrupted at half its length. An obscurely black streak on median line, between basal patch and inner third, a few black scales overlaying white patch on dorsal margin before inner third. Outer margin and cilia dark fuscous, a black dash in cilia just below apex. Hind wing dark smoky-brown, cilia darker. Under side fore wing dark smoky-brown, cilia lighter; five geminate whitish spots on costa. Under side hind wing and cilia fuscous. Abdomen, upper side same as thorax, black, with a few very minute brown specks, anal tuft purplish brown. On the second or third abdominal segment is a flattened tuft of long scales. Under side of abdomen and legs light fuscous, latter annulated with black and speckled, same as upper side of abdomen and thorax.

Protopteryx Columbia, var. *mediostriana*, var. nov.—Head brown, mixed with lighter and darker scales, mottled. Palpi mottled-brown outside, nearly white on inside and apex. Thorax smoky-black, very minutely speckled with brown; patagia with white spot on posterior end. Fore wing, ground colour very uniformly mottled bluish-grey, fuscous and black scales, with a few brown scales in patches and streaks. Beginning at base on median line and extending to outer margin just above anal angle is a pinkish fawn-coloured streak, slightly wider at outer end; a second streak of this same colour begins at base, but only extends to inner third, below and parallel to the long one, they are joined together at base. A number of geminate whitish dots on costa. Hind wing smoky fuscous, cilia fuscous. Under side, fore wing smoky fuscous, with geminate whitish dots repeated on costa. Hind wing fuscous, darker before apex. Abdomen very dark fuscous; under side paler. Legs fuscous.

Described from about 60 specimens, of which ten per cent. are var. *albidorsana* and the same number var. *mediostriana*. Bred by Dr. Dyar at Kaslo, B. C., on willow (?), and collected by Dr. Taylor, Wellington and Vancouver, B. C., and by Mr. Bryant, Wellington, B. C., latter part of February to latter part of March. U. S. Nat. Mus. Type Nos. 7789, 7790 and 7791, respectively.

This species is nearest to the European *Protoepteryx crenana*, Hbn., inasmuch as both are extremely variable; all of the British Columbia specimens are larger than *crenana*, the general colour of the latter is brighter and less sombre, and the hind wings of *crenana* decidedly lighter. I have no knowledge of the variety *mediostriana* occurring at all in Europe.

Named in honour of the earnest and hard-working Entomologists of the British Columbia district.

(To be continued.)

NOTES ON THE EARLY STAGES OF CATOCALÆ.

BY G. M. AND E. A. DODGE, LOUISIANA, MO.

Catocala obscura, Strecker.—Larvæ taken under hickory bark. Food-plant hickory. Described June 1st, 1903.

General colour, gray with pale brown and black markings.

No transverse band and no elevation of eighth segment.

Head broad as first segment, flattened, gray, with a black dash on each cheek, extending from mouth two-thirds of the way to top of head, and ending in a point.

Tubercles white, but not prominent; the dorsal tubercles being in a brownish stripe that is fairly distinct the entire length.

There are a few black spots along the outer edge of this stripe sometimes extended as short lines; and on the posterior part of the fourth and fifth rings shading inwardly and forming small triangular patches at the inner boundary of the stripe. The dorsum is gray with a faint central line. The gray portion has a wavy outline, forming somewhat oval patches, most conspicuous between the segments.

There is a narrow brown stigmatal stripe, distinct and of even width throughout. Stigmata black and in the lower edge of this stripe. No filaments. The eleventh ring is slightly raised and marked with black posteriorly. Venter greenish, with central spots on segments four, five, six, seven, ten and eleven. Legs pale.

In the CANADIAN ENTOMOLOGIST, Vol. XXXIII., page 225, we described the larva of a Catocala, determined by us as *C. Obscura*, Strk. This, however, was the form having dark fringe on the posteriors, and which is properly known as *C. residua*, Grt.

It is not uncommon to find this dark-fringed form under the name *obscura* in collections, and this error will be confirmed and more widely diffused through the publication of Dr. Holland's Moth Book, in which the same mistake is made.

The following extract from our description above referred to is given for comparison.

"Colour dusky gray. Head broad, but not high, whitish, with pale brown markings and a small, ill-defined black blotch at corners of mouth.

"The dorsal stripe is interrupted on fourth to ninth segments, inclusive, by black curved patches that occupy the space between the dorsal tubercles, and opening backward enclose white, cone-shaped patches, apex forward and truncate behind."

It will be seen that in the ornamentation of the dorsal region the two forms differ materially.

Of greater importance is the fact that while the larvæ that in 1901 produced *residua* had "a small, ill-defined black blotch at corners of mouth," those that in 1903 gave *obscura* had "a black acuminate dash, extending from the mouth two-thirds of the way to top of head."

These descriptions were taken from several larvæ in both instances, and the differences here recorded would indicate that the two forms should be classed as distinct species.

Colour variations in Catocala larvæ are frequent, and have no connection with the variations of the imago. But the pattern of the dorsum and the black marks of the cheeks are constant, and are good specific characters.

Described as a distinct species, the catalogue makers, with no better guide than a comparison of cabinet specimens, listed *residua* as var. "a" of *obscura*, thus assuming a knowledge that they did not possess, and thereby misleading all who were depending upon such lists for aid in arranging their collections.

Prof. Smith states in the preface to his new Check List that "all species and genera are treated as presumably good, *unless the contrary has been established.*" But *residua* is still var. "a" of *obscura* in his list. It would be interesting to learn who *established* the identity of these two forms, and just how it was done.

Catocala Whitneyi furnishes another case in point.

Soon after its description it was denied specific value, and became var. "a" of *abbreviatella*. It so appears in Smith's List, both the old and new editions.

This error is also given especial prominence in the "Moth Book," where the two forms are shown side by side.

Their likeness, together with the author's expressed opinion that they are forms of one species, will undoubtedly be taken as proof indisputable of their identity by the majority of readers.

At our former home in Nebraska we used to take a few *abbreviatella* every year. We noted that they invariably began to appear from one week to two weeks earlier than *Whitneyi*. When the latter was fresh and coming to bait nightly in considerable numbers, specimens of the former in a more or less worn and faded condition were to be encountered.

Manifestly if one was a variety of the other there should be no difference in the season of appearing.

The late Judge Truman, of South Dakota, took both species at Volga. He was satisfied that they were distinct, and gave the same reasons as cited above for his belief.

Here at Louisiana we take a few *abbreviatella* nearly every year, but have found no *Whitneyi*.

In the large number of specimens of both forms that we have taken during the last twenty years or more we have never found an intergrade, nor have we observed any variation of either form toward the other.

Nothing short of breeding one or both in confinement can definitely settle the question and prove or disprove their identity.

But if we array the facts as above stated against the bare assertion that "they look somewhat alike," the preponderance of proof seems to favor the contention that they are distinct.

If anyone has *established* the identity of these two forms we have overlooked it.

Prof. French, in his revision of the Catocalæ, published in this journal, rated both *residua* and *Whitneyi* as species, and they so appear in Dyar's Catalogue, which adopts his classification.

But Prof. French carefully consulted every available source of information before passing upon the validity of a species. As the years go by the intrinsic value of his work will be made manifest.

SOME NEW SPECIES OF PARASITIC HYMENOPTERA.

BY CHARLES T. BRUES, AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK CITY.

Dryinus nigrellus, sp. nov.—Female. Length 4.25 mm. Wholly black, except tarsi, part of antennæ and mandibles. Head black, finely rugulose, faintly silvery pubescent and sub-shining. Vertex impressed; front with a short median impressed groove above the antennæ. Cheeks roughened; mandibles pale yellow, with the tip of the teeth black; quadridentate, the outer tooth the larger and the inner one extremely minute; palpi black. Antennæ filiform, reaching to the base of the abdomen, ten-jointed; first three joints and base of fourth rufous, remainder black, except the last, which is pale yellow. Scape stout, slightly over twice as long as the pedicel; first flagellar joint twice as long as the scape, remaining joints decreasing in length, except the last, which is one and

one-half times as long as the penultimate. Pronotum ovoid, finely rugulose, with a transverse depression at anterior third; behind this very sharply convex; two and one-half times as long as the mesonotum and one-half as wide as the head. Mesonotum more coarsely sculptured than the pronotum, twice as wide as long, tegulæ piceous; scutellum large, finely rugulose, with a punctate frenum anteriorly. Metanotum slightly longer than the pronotum, rounded behind; rather finely and evenly longitudinally rugoso-aciculate. Abdomen ovate, black, highly polished, extreme tip rufous. Petiole shorter than the hind coxa; second, third and fourth segments about equal, the fifth somewhat longer. Legs piceous black, the swollen femora below and the knees reddish. Anterior tibiæ and their metatarsi fuscous, the tarsi chelate, rufous; four posterior tarsi pale yellow. Wings hyaline, marked with two fuscous spots; the first fills out the two basal cells, except their extreme bases, and the second covers the stigma and stigmatal vein, fading out posteriorly. Basal cells very distinct, marginal cell not complete; stigma of moderate size.

Described from a single female specimen collected at Parkville, Long Island, by Mr. Wm. Beutenmuller. Type in the collection of the American Museum of Natural History.

This species can be most readily recognized by its very dark coloration.

Bocchus atriceps, sp. nov.—Female. Length, 5 mm. Rufous, head and posterior portion of abdomen black. Head black, shining; rufous below the base of the antennæ; front coarsely rugulosely punctate above, below irregularly longitudinally striate: occiput margined; cheeks finely punctate and clothed with delicate white hairs; mandibles light yellow; maxillary palpi four-jointed, fuscous, joints nearly equal. Antennæ slender, reaching to the base of the hind coxæ; ten-jointed; four basal joints rufous, others black; scape short, stout, a little longer than the slender pedicel; both together equal to the long, slender first flagellar joint; second flagellar joint two-thirds as long as the first; others slightly decreasing in length to apex. Prothorax half as wide as head, a little longer than wide, constricted just before the apex; rufous, white pubescent on the sides. Mesonotum distinctly shorter than the pronotum, the two furrows deep; surface shining, rufous medially, fuscous on the sides. Scutellum semi-circular, separated from the mesonotum and post-scutellum by transverse furrows. Metathorax short, rounded behind, coarsely reticulate; rufous, except the anterior edge, which is black.

Abdomen ovate, polished, short petiolate, black, except the greater part of the first segment and the extreme tip, which are black; second, third and fourth segments sub-equal in length. Legs rufous, the tarsi lighter; femora, especially the anterior pair, very stout; anterior tarsi chelate, first joint long; anterior femora with a black mark below at the base, tips of posterior femora and tibiæ also black. Wings hyaline, with a fuscous band just beyond the stigma, also a faint fuscous spot at the apex of the second basal cell, stigma lanceolate.

Described from a single female specimen collected at Mosholu, N.Y., July 25, 1903, by Mr. J. R. de la Torre Bueno.

This species may be distinguished from the only other described species of *Bocchus* (*B. flavicollis*, Ashm.) by its colour, larger size, different length of abdominal segments and configuration of the antennæ. It agrees very well with the generic diagnosis given by Ashmead (Monog. Proctotrypidæ, p. 91).

Oxylabis bifoveolatus, sp. nov.—Male. Length, 3 mm. Black; legs fuscous, varied with rufous. Head shining black, rugulose on the occiput, with a short impressed longitudinal line above the ocelli; head margined behind; cheeks shagreened; mandibles dark fuscous. Antennæ 14-jointed, distinctly longer than the body, tapering toward the tips; two basal joints black, the rest fuscous. Scape very short, twice as long as the pedicel, which is less than one-half as long as the first flagellar joint; first eleven flagellar joints of equal length, the last one and one-half times as long as the preceding and more slender. Sides of the pronotum coarsely and obliquely striate. Mesonotum with two deep furrows, less pronounced anteriorly, and with a triangular fovea just before the scutellum. Scutellum with two deep foveæ. Post-scutellum with a median groove and a more delicate one on each side; its tip produced into a long, acute black spine, which is perpendicular to the posterior face of the metathorax. Metanotum anteriorly coarsely rugose-striate, at the middle with a widely-interrupted transverse furrow, behind this with a fovea on each side, and medially at the tip with a large enclosed space. Petiole on abdomen suddenly constricted in front, a little wider than long and coarsely fluted. Remainder of abdomen compressed and very shining, impunctate; second segment very long, others short. Legs fuscous; front tibiæ, knees and bases of the tarsi lighter. Wings

hyaline, basal aand marginal cells complete ; the latter completely closed, one and one-half times as long as high, and with the stump of a vein at its lower angle.

Described from a single specimen from Snake Hill, New Jersey ; collected in June by Mr. Wm. Beutenmuller. Type in the collection of the American Museum of Natural History.

This species can be easily distinguished from *O. spinosus*, Ashm., the only other described North American species, by its bifoveate scutellum, and straight, black, post-scutellar spine.

ON THE GENUS PROTEOPTERYX.

BY PROF. C. H. FERNALD, AMHERST, MASS.

This genus was established by Lord Walsingham in Illustrations of Typical Specimens of Lepidoptera Heterocera in the collection of the British Museum, Part IV., North American Tortricidæ, p. 68 (1879), with *emarginana*, Wlsm., the only species under it. This variable species was taken in Mendocino and Lake Counties, California, in considerable numbers (about 40 specimens) in June, 1871, and five varieties were described. His Lordship had the great kindness to give me several examples representing the different varieties.

The generic characters, as given in the original description, need some revision, which the author would doubtless have given before this time if he had had occasion to review the genus. There is a costal fold in the three male specimens of this species in my collection, which character the author overlooked, as it is generally so closely pressed to the surface of the wing as to be scarcely visible, but in one of my specimens the fold on one wing is turned up sufficiently to expose the usual pencil of long hairs. Veins 7 and 8 of the fore wings are said to be "scarcely separate at their origin," which is true in my examples of this species, but in some allied species belonging to this genus these veins arise near each other, or are connate, or stalked, or sometimes connate in one wing and stalked in the other of the same specimen. Vein 5 in the hind wing is bent down, and has its origin near that of the stem of 3 and 4, which are stalked. The European species, *cremana*, Hub., belongs to this genus.

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REV. C. J. S. BETHUNE,

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MAY, 1904.

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1904.

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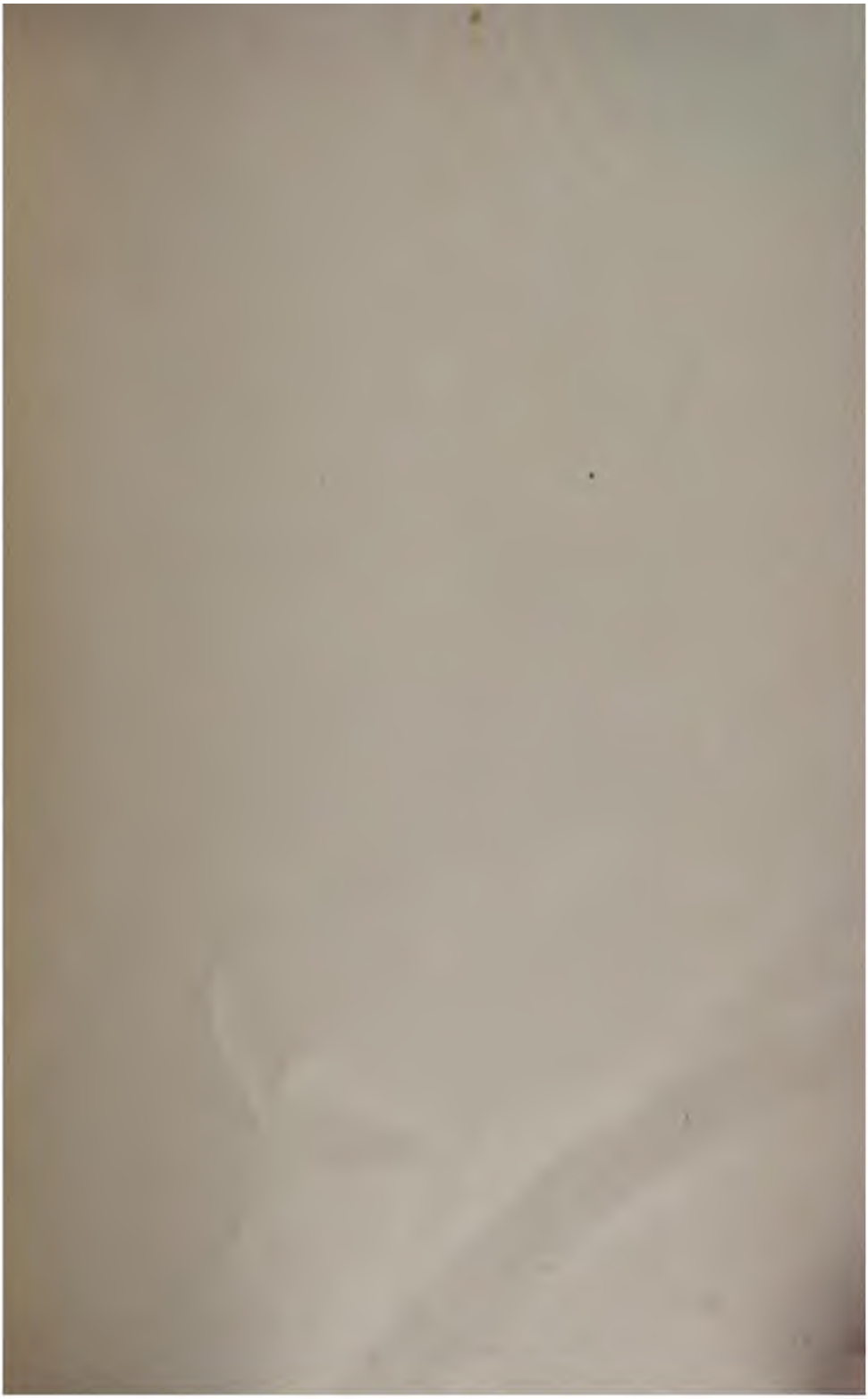

LYCÆNA PSEUDARGIOLUS
VAR. NIGRESCENS ♂
THECLA STRIGOSA
VAR. LIPAROPS
PHYCIODES HANHAMI
LYCÆNA PSEUDARGIOLUS
VAR. ARGENTATA ♂
VAR. ARGENTATA ♂ (UNDERSIDE)

LYCÆNA PSEUDARGIOLUS
VAR. NIGRESCENS ♀
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PHYCIODES HANHAMI ♀
THECLA HEATHII ♂ (UNDERSIDE)
LYCÆNA PSEUDARGIOLUS
VAR. ARGENTATA ♀

The Canadian Entomologist.

VOL. XXXVI. LONDON, MAY, 1904. No. 5

DESCRIPTIONS OF SOME NEW SPECIES AND VARIETIES OF CANADIAN BUTTERFLIES.*

BY JAMES FLETCHER, OTTAWA, ONT.

Read May 19, 1903. Separates distributed January 22, 1904.

I submit herewith descriptions of 3 species and 3 varieties of Canadian diurnal Lepidoptera, specimens of which have been in my collection for many years, and of which a continued study convinces me that it is wise to characterize them for the benefit of other students of Canadian butterflies. It is possible that some of these may be only local races, but they are so constant that I believe them to be well worthy of recognition. In describing these forms, I have endeavoured to compare them with their nearest allies, as a description, even when accompanied by a plate, is more intelligible when a new form can be compared with a well-known standard. My thanks are due to Dr. Henry Skinner, of Philadelphia, who very kindly undertook the arrangement and preparation of the specimens illustrated on the plate given herewith, and also from his own cabinet provided some specimens which were better for illustration than the actual types used in the descriptions. I have also to express my gratitude to the American Museum of Natural History for a beautiful painting of *Thecla Heathii*, which was specially made for the purpose and used for the accompanying illustration, on account of two of the wings in the type specimen being imperfect. It is well here to mention that this painting is, in my opinion, almost as perfect as a drawing can be, and represents exactly the appearance of the type in every mark and spot as well as in colour and shape. Mr. Wm. Beutenmuller very kindly undertook personally the supervision of this painting.

The names used in this paper are those in the recognized check lists of diurnal Lepidoptera now used by American entomologists, viz.: the "List of Lepidoptera of Boreal America," by Dr. J. B. Smith, 1891, and "A Synonymic Catalogue of the North American Rhopalocera," by Dr. Henry Skinner, 1898. Up to the present time the names given by Dr. S.

* Reprinted from the Transactions of the Royal Society of Canada, Section IV., 1903. p. 207.

H. Scudder in his magnificent work, "The Butterflies of the Eastern United States and Canada," have not been adopted by collectors in labelling their collections. These names, however, are, I believe, for the most part well founded, and it is merely a matter of time before they will be generally accepted.

PHYCIODES HANHAMI, n sp. (Hanham's Crescent.)

Sexes similar both in colour and markings. Alar expanse, males 37–38 mm.; females, 40–43.50 mm.

Upper side.—Wings bright orange fulvous, darkened towards base and bordered with a clear black margin, which is widest at apex of primaries. The base and cell marked as in *P. nycteis* and with the same "tangle of black lines" mentioned by Dr. Scudder in his description of that species; the basal area, however, is never so black as in *nycteis*, and in some specimens the ground colour is hardly darkened at all. All the veins of both wings are lined with dark brown.

Fig. 4—P. NYCTEIS. Db.-Hew.

The white marks of the under surfaces of both wings are repeated above as light yellowish contrasting spots, giving the species a much brighter appearance than *nycteis*, in which this feature does not occur, even in the forms of that variable species where the fulvous colour predominates on the upper surface. A striking character in which *Hanhami* differs from both *P. nycteis* and *Melitæa Harrisii*, a species which it also resembles, is the absence on the secondaries, above, of the median black line, which in those species divides the fulvous discal area on almost all specimens. There is a more or less complete series of submarginal ocelli in the interspaces between the submarginal and median veins, but these are smaller and less distinct than in the two species named, and in some specimens are obsolete. Fringes white, interrupted with black at the tips of the nervures. *Under side.*—Fore wings fulvous brown, marked with brown streaks and pale spots, after the pattern of *M. Harrisii*, but much paler and less contrasting, owing to the absence of black marks. Apical area very little darkened. There is a submarginal series of nacreous lunules in all the interspaces, except the lowest, and inside this a sinuous series of pale spots. Margin fulvous, narrow, wider than in *nycteis*, but always narrower and more regular than in *M. Harrisii*. Hind wings with

colour areas distributed as in *nycteis*, but much less contrasting, the basal area being bright fulvous, and the brown field at apical margin less intense in colour. At base are 5 large nacreous spots and a dash inside the internal vein. The triple mesial band is wide, distinct, and nacreous, the spots of the same shape and comparative length as in *nycteis*; but the outer tranverse traversing line is somewhat angled where it crosses the nervules, that is, is made up of short, almost straight dashes as in *M. Harrisii*, not of rounded crenations as in *nycteis*. The outer margin of this band is, as in *nycteis*, not clearly defined, a character in which both of these species differ from *M. Harrisii*, where this is distinctly the case. Beyond the mesial band is a row of 5 ocelli, the central one of which is white, ringed with brown, and the two outer ones on each side of this are black, shaded inwardly with fulvous and pupilled with white. The most conspicuous character of this species, and one by which it is easily separated from *nycteis*, is the complete series of large marginal silvery lunules which occur on every interspace, as in *M. Harrisii*. In *Hanhami*, as in *nycteis*, the pattern below is outlined in brown, while in *Harrisii* the margins of the spots are black, thus producing the well-defined and distinct pattern which is characteristic of that species. Body above black, fulvous on sides, silvery beneath. Abdomen banded narrowly with white above. Antennæ black above, banded with white, bright fulvous beneath. Palpi silvery white, fulvous at tips. I must acknowledge that I refer this species with some hesitation to the old genus *Phyciodes*. The general appearance and venation seem to make it congeneric with *nycteis*; but, at the same time, the upper sides of some specimens resemble closely extreme forms of *M. Harrisii*, in which the yellow colour predominates, and in addition, the shape of most of the markings beneath is similar to those of that species. On examining a good series of specimens, the venation comes rather under the genus *Charidryas*, characterized by Scudder, and as figured by Holland in the Butterfly book, than under *Cinclidia*. Although, as stated, the markings resemble more closely those of *Harrisii* in shape, the distribution of the colour areas is more as in *nycteis*. There is also in the mottled appearance of the under side a resemblance to *P. mylitta*, which is congeneric with *nycteis*.

Distribution: Manitoba (Eastern, Central and Southern), Minnesota. The first specimens of this insect seen by me were in the collection of Mr. A. W. Hanham, at Winnipeg, near which place, at Bird's Hill, he had taken them late in June, 1895. Subsequently I took several specimens at the same place and at Brandon in the beginning of July.

Mr. L. E. Marmont finds the species not uncommon at Rounthwaite, Man., and Mr. Norman Criddle takes it also at Aweme, Man. Dr. Wm. Barnes writes me that he has specimens from near Minneapolis, Minn.

Described from 12 specimens (6 males and 6 females). The types of both sexes, which are figured, are deposited in the U. S. National Museum at Washington. The species is named after Mr. A. W. Hanham, an enthusiastic and indefatigable collector, who has done so much towards working up the insect fauna of Manitoba and British Columbia.

THECLA STRIGOSA, Harr., var. LIPAROPS, n. var. (The Bright-eyed Hair-streak.)

In the CANADIAN ENTOMOLOGIST for November, 1895, p. 315, I referred to the Manitoban form of *Thecla strigosa*, and expressed the opinion that this form was worthy of at least varietal recognition. This is, as far as I have seen, always shows the large, rich fulvous, well-defined blotches which are represented on the plate herewith. The ordinary form of *T. strigosa* is shown in the accompanying wood-cut. (Fig. 5.)

I have examined during the last fifteen years a great many specimens of this variety from Manitoba, and all without exception showed the two large fulvous eye-like spots on the primaries. Mr. E. F. Heath, who formerly took the insect in numbers at Cartwright, Man., writes: "I have never taken this form without the fulvous patch on the primaries in both sexes, and I have certainly taken and seen over one hundred specimens. Four or five years ago, and for years prior to that, it was very abundant here; now it seems to have disappeared. I do not come across one in a season."

Mr. L. E. Marmont, of Rounthwaite, Man., who has lived and collected in Manitoba for many years, writes: "I have only 9 specimens of your variety *liparops* of *strigosa* just now; but all have the large fulvous blotch on the fore wings. In one female it is fainter than the others, but quite noticeable; in another female the primaries are almost entirely fulvous with only a blackish border."

Fig. 5.—THECLA STRIGOSA, Harris. Eastern form.

Occasional specimens of the eastern *T. strigosa* show a more or less poorly-defined fulvous blotch on the upper side of primaries, but such specimens in my experience have proved to be of decidedly rare occurrence. Dr. Scudder thinks that Boisduval and Leconte intended to represent

under the name of *T. liparops*[1] what we now know as *T. strigosa*, Harris. I can hardly think that this is the case; but it seems well to preserve the name; so, I suggest that it should be used for the variety found in Manitoba, which constantly shows on the primaries above a bright clearly-defined blotch, and this was the chief character from which the name *liparops* was derived. On discussing the reference by Dr. Scudder of Harris's *strigosa* to Boisduval and Leconte's plate with Mr. W. H. Edwards some years ago the latter wrote as follows: "Scudder says this is *strigosa* of Harris, but no one would know it from the figures. The description is done from the figure and not from the insect; therefore, *liparops* represents no insect, but merely the said figure, and for that reason I reject the name. The first time the insect was described was by Harris, and his name prevails." In addition to the large and handsome golden fulvous, almost quadrate patch which occupies nearly half the area of the primaries, the secondaries are also frequently ornamented with a fulvous cloud at the anal end, near the tails. The under side of the western form is of a darker brown than in the type, with the white lines much paler, these in some specimens being almost obliterated.

Described from 10 specimens taken at several places in Manitoba: Beulah (Dennis); Cartwright (Heath); Aweme (Criddle); Brandon (Fletcher); Routhwaite (Marmont).

The types described herewith are deposited in the United States National Museum at Washington.

THECLA HEATHII, n. sp. (Heath's Hair-streak.)

Described from one female (not a male, as stated on the plate.) Alar expanse, 26 mm.

Upper side.—Blackish-brown (when taken), as in *T. calanus*. Costa at base finely edged in front with yellow, as in *calanus* and *acadica*.

Under side.— Fawn-brown, faintly washed with white from the base almost up to a submarginal band of large pearly-gray blotches which occur on all the wings. On the primaries these are four in number and ovate. On the secondaries there are five square blotches and a long whitish spur running up the inner margin. Exterior to these blotches is an incomplete series of marginal lunules, as in several other allied species of the genus; consisting of, at the anal angle, between the internal and submedian veins, a few scarlet scales shaded exteriorly with as many white ones and bordered inside and outside with black; between the submedian

[1] Histoire générale et iconographique des Lépidoptères, p. 99; Pl. 31, fig. 1.

and the first median veins is a large, wide and shallow white lunule, without any scarlet scales; between the first and second median veins, a scarlet crescent outlined on both sides with black and shaded externally with white; between the second and third median veins is a small red lunule one-third the size of the last, shaded externally with white.

The specimen here described and figured has no tails to the secondaries, but, from the appearance of the ends of the veins and the marginal pattern, as well as the presence of a few longer scales at the end of the first median vein, I have no doubt that originally tails existed.

On the primaries the ovate blotches are bordered on each side by a broad band about two-thirds their own width, and darker than the ground colour of the wings. On the secondaries the series of square blotches is outlined on both sides by an almost black angulated line. Beyond the cell on all the wings is a large dark, oblong quadrate blotch; the fringe on all wings is dark. Eyes ringed with pearly white; palpi white, tipped beneath with black; antennæ black, ringed with white; club orange below and at the tip.

Locality.—The type was taken by Mr. E. Firmstone Heath, near his home in the picturesque valley of the Long River, a few miles from Cartwright, in Southern Manitoba. This spot is about ten miles north of the boundary of North Dakota and about 25 miles north-east of the Turtle Mountains. This valley, near Mr. Heath's house, is about a mile wide, and is well-wooded with scrub oaks (*Quercus macrocarpa*), ash-leaved maples (*Acer negundo*), aspen and balsam poplars (*Populus tremuloides* and *P. balsamifera*), Saskatoon-berry (*Amelanchier alnifolia*), white thorn (*Cratægus coccinea*), wolf-berry (*Symphoricarpus occidentalis*), prairie roses, wild plum (*Prunus nigra*), a few American elms, choke-cherries and various willows. Mr. Heath tells me that it was taken in July about 25 years ago, and, although he has been keenly on the lookout ever since, he has never seen another specimen. It is a remarkable form, and, as will be seen from the accompanying plate, which is an excellent representation, bears very little resemblance to any described species.

The species of *Thecla* occurring at Cartwright at the season *T. Heathii* was taken are *T. acadica*, *T. calanus*, *T. strigosa*, var. *liparops* and *T. titus*. The pattern of the under side of the insect here described in no way resembles that of any of these, and I can hardly think that it is a suffused albinic variety of any of them.

The type which was generously presented to me by Mr. Heath, after whom it was named, is deposited in the United States National Museum at Washington. The painting from which the figure in the plate was made is in my own collection.

LYCÆNA PSEUDARGIOLUS, Bd.-Lec., var. ARGENTATA, n. var. (The Manitoba Blue.)

The beautiful variety of the common Spring Blue butterfly figured herewith is the prevailing form in Central and Southern Manitoba, where it has usually been named by collectors var. *neglecta*. From this latter, however, it differs in having the black marks of the under side less distinct, in some specimens these are almost entirely obliterated so as to present a clear, nearly unspotted, surface of silvery white. The illustration given herewith does not quite represent the colour of the under side, rather too much of the red pigment having been used, which gives it a warm tint not seen in nature. The shade of blue of the upper surface in both sexes is, as a rule, paler than in other forms (or varieties) of *pseudargiolus*. In the females the discal area of primaries is silvery white, with a blue reflection and a more decided flush of blue at the base.

Described from 18 specimens (12 males and 6 females) collected at Cartwright and other places in Southern Manitoba, as well as in south-eastern Assiniboia. The types of both sexes are deposited in the U. S. National Museum at Washington.

LYCÆNA PSEUDARGIOLUS, Bd.-Lec., var. NIGRESCENS, n. var. (The Kaslo Blue.)

An interesting variety of *L. pseudargiolus* has been sent to me by Mr. J. W. Cockle, from Kaslo, on Kootenay Lake, British Columbia, where it is in the common spring form. The most conspicuous difference between this and the other described varieties of the stem species, is the large amount of black on the upper surface of the females. This darkening forms a wide black border on the costal and outer margins of primaries, and spreads over the whole surface of the secondaries, which merely show a little blue on the folds between the veins. The blue of the disc of primaries is a dark purplish-blue, as in var. *piasus*, and is frequently irrorated with black scales. The upper side of the male is a deep rich violet-blue, almost of the same shade as in *amyntula*. The under side of this variety is remarkable, and specimens of both sexes may be found which, if the under side alone were seen, might be referred to *neglecta*, *violacea*, *lucia* or *marginata*, and some even combine characters

of all of these. One beautiful form which frequently occurs has an irregular discal dark blotch of confluent spots on the secondaries beneath as in *lucia*, and the clear marginal and submarginal spots of *violacea*. This form Mr. Cockle, who has collected this butterfly for several years and has been much interested in it, considers to be most typical of the variety. In all forms of this Kaslo Blue the eye-like spots of the marginal band are distinct, a character in which it differs from *piasus*. Some specimens beneath show the marginal band of *marginata* either with or without the confluent discal patch.

Described from 16 specimens (8 males and 8 females). Types of both sexes deposited in the U. S. National Museum.

PAMPHILA MANITOBOIDES, n. sp. (The Nepigon Skipper.)

In the annual report of the Entomological Society of Ontario for 1888 I described the larva of a *Pamphila* belonging to the *comma* group, which Dr. Scudder and I had taken in small numbers in the first week of July at Nepigon, Ont., north of Lake Superior. In subsequent years I have found the butterfly as early as the last week in June. In low lands the favourite flower visited seems to be *Mertensia paniculata*, but on the higher rocky ridges along the Nepigon river this skipper seems to confine itself almost entirely to the inconspicuous white flowers of *Potentilla tridentata*. It is extremely shy, active and difficult to catch.

This species is rather smaller than *P. Manitoba*, but the markings of both sexes above are very similar to those of that species, although the colours are different. In *Manitoboides* the upper side is a rich tawny-brown with a wide very dark brown margin. None of the spots at apex of the primaries are hyaline, and the bases of both primaries and secondaries show a much less broken field of brown colour than is the case in *Manitoba*. The male and female above are perhaps rather more like the figures of *P. Colorado*, given by Dr. Scudder on plate X., fig. 17 and 18, in his paper "On the Species of the Lepidopterous Genus *Pamphila*," in the Memoirs of the Boston Society of Natural History, Vol. II., Part III., Number IV. (1874), except that the tone of colour is of a more fuscous brown and the border is darker, giving more contrast with the light shades.

Under side.—A bright tawny brown in fresh specimens, primaries much darkened at the base. The whole tone of colour of the under side, including the dark shade at the base of primaries, and the washed-out appearance of all spots, both on primaries and the mesial band of

secondaries, very similar to the under side of the British Columbian *P. agricola*. The mesial band is dull yellow, inconspicuous, angled and irregular, composed of the same squarish spots as in *Manitoba*. These are perhaps normally 8 in number, as in *Manitoba*, when all are present, but this is seldom the case in this species. I have only eight specimens before me at the present time: in one of these there are seven spots and a trace of the eighth; in one specimen there are seven, in five six, and in one five. The spots of the lower portion of the band, when present and of full size, confluent or nearly so, the two spots at the angle of the band usually smaller than the others. The large V-shaped spot, so conspicuous in the cell of *Manitoba*, is inconspicuous and frequently absent. The spot at the base of the submedian interspace seldom present or very small. In the males the light colour of the spots has a tendency to run out along the veins, both towards the margin and to the base of the wings, in the same way as in *P. uncas*.

Alar expanse, males 28–31 mm., females 30–32 mm.

Locality.—Up to the present time I have only taken this species at Nepigon, Ont., and Sudbury, Ont. Specimens sent to Mr. Henry Edwards many years ago were at first named by him *Pamphila sylvanoides*, but he subsequently wrote to me: "Your Northern Ontario *Pamphila* is not *sylvanoides*, but must come nearer to one of the forms of *comma*, such as *Manitoba* or *Colorado*; but the under side shows that it is quite distinct from either of these."

P. Manitoboides occurs at Nepigon, as stated above, from the third week in June until the middle of July. A month or six weeks later than this the true *P. Manitoba* appears, which is a rather large insect, with a greenish tinge on the under side and distinct silvery white markings. The eggs of *P. Manitoboides* hatch about a fortnight after they are laid, but, as has been shown by the Rev. T. W. Fyles [CANADIAN ENTOMOLOGIST, XXVII. (1895), p. 346], the eggs of *Manitoba* laid in August do not hatch until the following spring. The larva of *Manitoboides*, as described by me in the Report of the Entomological Society for 1888, does not quite agree with Dr. Fyles's description of *P. Manitoba*. I have no idea that this species is very closely related to *P. Manitoba*, and the name was only given to indicate a somewhat close resemblance on the upper side to that species. I did not intend, when publishing the description of the larva, that the name *Manitoboides* should stand, and particularly mentioned in the article referred to, that, as I did not wish to

cause confusion by naming what might prove to be a described species in a difficult genus which I had not specially studied, I refrained from further describing the perfect insect. Unfortunately, this precaution seems to have been unavailing, for several have written to me for further information on the species; and, as the name has been introduced into published lists of North American Lepidoptera, I have thought it best to prepare the description here submitted, particularly as further study has convinced me that the species here named does not agree with any of the described species of this genus.

Described from 9 specimens (3 males and 6 females). Types of both sexes deposited in the U. S. National Museum.

A NEW GENUS AND SPECIES OF NORTH AMERICAN CHOREUTINÆ.

BY PROF. C. H. FERNALD, AMHERST, MASS.

Genus KEARFOTTIA

Frons smooth and rounded, with the scales inclining downward, not closely appressed, erect on the vertex; labial palpi ascending, the second segment with more or less separated scales beneath, recalling the genus *Choreutis*, third segment a little shorter, naked and somewhat pointed; maxillary palpi present; proboscis very short; eyes hemispherical; ocelli absent; antennæ not quite half the length of the costa, ciliate, the ciliæ nearly as long as the diameter of the shaft; thorax with a small tuft at the end above.

Fore wings subelliptical, nearly three times as long as wide; vein 1b with a long fork at the base and ending near the outer third of the hind margin; cell about two-thirds of the length of the wing; vein 2 arises before the end of the median, a little further from 3 than that is from 4; veins 3 to 10 nearly equidistant at the origin; 11 arises from the subcostal vein near the end of the first third of the cell; 7 ends in the outer margin and 8 in the costa; the anterior intercellular vein arises from the subcostal intermediate between the origin of veins 10 and 11 and forks near the cross vein, the forks running into 7 and 8; the posterior intercellular vein arises at the base of the wing and continues beyond the cell as vein 6.

Hind wings about half as long as wide, subsemicircular; median vein not pectinate above towards the base; three internal veins, vein 1b forked at the base, 2 from near the beginning of the outer third of the

median vein ; 3 and 4 coalesce and arise from the lower angle of the cell ; 5, 6 and 7 nearly equidistant, 7 from the base of the wing ; 8 arising free from the base of the wing, running nearly intermediate between the costa and subcostal vein, ends in the costa a little below the apex ; cross vein very oblique from the base of 5 till it joins the cellular vein from the base of the wing, then runs up and joins vein 7 a little before the middle.

This genus is more closely related to *Choreutis* than to any other genus known to me, but is without the metallic scales and some other characteristics of *Choreutis*. The venation of the fore wing is like that of *C. onusta*, Walk., but that of the hind wing differs in the course of the upper part of the cross vein and in having a much stronger intercellular vein.

Named in honour of Mr. W. D. Kearfott, who has so successfully begun the study of the North American Microlepidoptera.

Kearfottia albifasciella, n. sp.—Expanse of wings 9 to 10 mm. Head, thorax, base and outer part of fore wing dark brown with bronze reflections ; middle of the wing cream-white, with four equidistant dark brown dots on the costal and three on the hind margin of this white fascia ; these dots are not present in all the specimens. The dark basal area has a vertical nearly straight outer edge, though there is a slight indentation on the submedian fold. The terminal dark bronzy-brown area which covers about a third of the wing has an oblique wavy inner edge, varying somewhat in the different examples. Fringe concolorous, with a whitish fleck near the anal extremity.

Hind wings and fringes above and beneath, and also the abdomen above, fuscous. Under side of fore wings fuscous, lighter beneath the median fascia. Under side of thorax and abdomen and the legs dull yellowish-white ; the fore coxæ, femora and tarsi in front and the middle tibiæ and tarsi in front, dark fuscous.

Described from three specimens, two taken at Plummers's Island, Md., July 1893, by Mr. August Busck, and one in Cincinnati, Ohio, July 7, 1903, by Miss Annette F. Braun. One cotype is in my collection, one in the National Museum, Washington, D. C., and one in the collection of Mr. W. D. Kearfott, Montclair, N. J.

AN ARBOREAL ORCHELIMUM.

BY WM. T. DAVIS, NEW BRIGHTON, STATEN IS., N. Y.

Those who visit the pine-barrens of New Jersey know what a pleasure it is to ramble along the narrow wooded-paths among the pine trees ; old paths that after once being made continue for many years, and may seldom entertain a pedestrian. Along these paths and by the side of the sandy roads, any time during late summer and until frost, one may hear a faint, lisping little song from a grasshopper coming from the pines, often from their topmost branches. It is an easy matter to climb the pitch-pine, which is usually arranged admirably for the purpose, and the grasshopper is also friendly to investigation, and commonly continues to stridulate.

Two stout insect-nets clapped together suddenly about the centre of the music will often disclose the grasshopper in one of them, but not always. He is a tree-loving insect, and being subject to the tossings of the wind, holds on tighter than most grasshoppers that I have had dealings with. It is, in fact, the only arboreal *Orchelimum* that I have found in New Jersey.

When he is captured, it will be discovered that he is a small affair, only 22 to 23 mm. long, including the wings, and that he has decided colours ; the green is very green in places, and the brown markings are conspicuous. The brown stripe on the prothorax is particularly dark, and the same colour continues on the wing-covers. The female is usually two or three mm. larger than the male.

In the CANADIAN ENTOMOLOGIST for April, 1891, Prof. Laurence Bruner writes of a single female specimen of this species taken in the District of Columbia. He says : "This latter form is also undescribed, and can be known temporarily as *Orchelimum minor*, from its rather small size and short wings. In colour it is rather less green than usual, and has the brown markings very decided. Its ovipositor, which resembles that of *gladiator*, is also brown instead of green." I have sent Prof. Bruner other specimens, and he has confirmed my identification.

Sometimes *Orchelimum minor* can be observed on the low branches of a pine, especially if the tree stands in the open, and the insect may occasionally be beaten into an umbrella. When the trunks of the pines are "sugared" for moths the little *minor* also attends, and, like many other members of the genus, it is active and musical both by day and night.

THE SPINNING HABITS OF NORTH AMERICAN ATTACI.

BY F. M. WEBSTER, URBANA, ILL.

The note in the CANADIAN ENTOMOLOGIST for April 1903, by the late Prof. A. R. Grote, the one by Mr. J. Wm. Cockle, in the May number for the same year, and the one in the April 1904, number, all relating to this subject, have interested me greatly.

Over 25 years ago I observed and recorded for the first, I believe, the destruction of the pupæ of our very common *Samia cecropia* by the Downy Woodpecker, by puncturing the cocoons and feasting on the juices of the occupant. The habit of the insect in attaching its cocoon firmly to and parallel with the twigs and smaller limbs of trees places them at the mercy of these birds, especially during that part of the year when the trees are devoid of foliage. It has seemed me that this habit of the bird has become more apparent during this time, but this may be on account of my paying more attention to the matter, and thus having seen more of their work.

I have been watching to see if the insect would gradually come to adopt a less dangerous cocooning habit, but up to the present time have not myself observed any notable variation from the old-time custom. In the case of *Tropæa luna*, the problem appears to have been solved by the larvæ cocooning on the ground among the fallen leaves, while *Telea polyphemus* seems to have but partly arrived at a similar solution by largely cocooning on the ground, while *Callosamia promethea* has entirely outgeneralled the woodpecker by swinging her cocoon, enclosed also within a folded leaf, and attached to the twig or limb by a stout silken thong, which allows the whole structure to dangle some distance below the point to which it is thus anchored. In this position the cocoon responds to the impact of the beak of the bird, which, instead of penetrating the cocoon, simply pushes it away, to at once swing back into place uninjured. Whether these are the results of a gradual change of cocooning habits or not, the effects are as given. *Telea polyphemus* has long been known to spin her cocoon largely upon the ground; the experience of Mr. Denny about Montreal being exceptional, and therefore very interesting, and especially so as the habit appears to vary with different years. If Mr. Denny would consent to observe, if possible, the interrelation of the woodpeckers with this species, and especially if the cocoons fastened to the twigs or limbs of trees are destroyed by these birds, it will be possible for him to make a decided accession to our

knowledge regarding this interesting subject, for the tree-cocooning habit in this instance seems to be rather abnormal, and raises the question as to whether it is in that locality rather behind in adopting the terrestrial habit of cocooning, or in advance in abandoning that and adopting that of cocooning in the trees inhabited by the larvæ. This will also aid Mr. Cockle in solving his equally interesting puzzle as how to account for the same insect in his locality cocooning after the manner of *C. promethea*. And this last gentleman can also do science a lasting service if he can throw any light on the interrelation of the species and the woodpeckers in his locality. We have in these notes some very interesting facts relative to the habits of some of our common species of Attaci, but we cannot without further observation and more facts decide whether these phenomena are due to natural selection and a change of habit or whether they are perplexing coincidences. Then, too, possibly others may have some observations to offer that will help us in getting more light on the subject.

A COUPLE OF QUERIES.

BY REV. G. W. TAYLOR, WELLINGTON, B. C.

In his Monograph of the Geometrid Moths, Dr. Packard described and figured two moths as *Metanema quercivoraria*, Guenée, and *Endropia textrinaria*, Grote and Robinson. He placed them in different genera and had apparently no doubts as to their distinctness.

With regard to *M. quercivoraria* (page 544), he does not state what material he had before him, but his figure, pl. XII., fig. 39, clearly represents a female with simple antennæ. In giving the dimensions of the moth, however, he speaks only of the male. Packard suggests that *M. aeliaria* of Walker may be a synonym, and Hulst (Ent. News, VI., 14), from an examination of the type, confirms this. *M. aeliaria* was described from the female only.

M. quercivoraria is also figured by Holland in the Moth-book, pl. XLV., fig. 28, and again it is the ♀ that is represented.

Endropia textrinaria was described and figured by Grote and Robinson from the male only. Packard (Mon., 507), redescribes it from 3 ♂ specimens. His figure is also of a ♂, and he makes no mention of the female.

Hulst, in his "Classification" (Trans. Am. Ent. Soc., XXIII., p. 378), brings the two insects together, placing them side by side in the genus *Metanema*.

Both forms have the same range, and both occur with us in British Columbia.

All the specimens of *quercivoraria* which have so far been taken by our B. C. collectors, and all the specimens I have received from various localities in the United States and Canada, together with, so Dr. Dyar informs me, all the specimens in the United States National Museum, are females, and all the specimens of *textrinaria* are males.

The inference would seem to be that these forms are sexes of one species which would retain the older name of *quercivoraria*, and that Packard made a slip of the pen in giving dimensions of ♂ *quercivoraria*.

If this is not the case, then we must be confounding the males of two species under the name *textrinaria*, and similarly the females of two species under the name *quercivoraria*, which seems very unlikely. Will readers of the CANADIAN ENTOMOLOGIST kindly examine their series under the above names and tell us whether they find two species or one?

My second query relates to the insect described and figured by Packard in the Proc. Bost. Soc. Nat. Hist., 1874, and again in the "Monograph," p. 453, as *Cleora umbrosaria*. The type was one male from California (Edwards), but the description in the Monograph is from four males, the additional ones being from Victoria, Vancouver Island (Crotch), and it is one of these that Packard figures on plate XI., fig. 33.

This figure shows a moth with *pectinated* antennæ. In his description Packard says "antennæ broadly pectinated as usual," and he places the species in *Cleora*, in which genus, of course, the ♂ antennæ are always pectinated. Hulst removed the species to his genus *Nepytia*, in which also the antennæ of the males are pectinated, but at the same time he changed the termination to "ata," signifying that the antennæ are *simple*. But this moth is common in British Columbia, and our specimens, some of them from Victoria one of the type localities, agree exactly with Packard's description, except that in the male the antennæ show no signs of pectination. Our species, then, cannot be a *Cleora* in any sense, or a *Nepytia*. It, in fact, belongs to the genus *Enypia*, Hulst.

The question then is this: Is there in California a species of *Nepytia* with pectinated antennæ to which Packard's original type belonged and which he failed to distinguish from the Vancouver Island specimens, or was Packard, who had four males before him, in error with regard to the "broadly pectinated antennæ," which he both described and figured?

In the first case the Vancouver species will require a new name. In the second case all that will be needed will be to transfer the species *umbrosata*, Packard, to the genus *Enypia*.

NOTES ON INCISALIA AUGUSTUS.

JOHN H. AND H. COOK, ALBANY, N. Y.

On the 6th of June, 1903, we found a Thecla caterpillar unknown to us feeding openly upon the berries of *Vaccinium corymbosum*. Its general colour was bright yellowish-green, which served to render it comparatively inconspicuous while feeding in the midst of a cluster of the unripe fruit. A faint, darker, dorsal stripe and a very minute coral-red spot in the middle of each segment, just above the lateral fold, were the only markings. The head was of a uniform light brown, and the body was clothed with short pile. Length, 12 mm.

This larva fed voraciously, biting a hole in the side of each berry attacked and eating only the interior. One afternoon, having exhausted the immediate supply of fruit, it was observed to crawl to a leaf, upon which it fed readily enough until a fresh supply of the berries was introduced into the breeding cage.

On the 12th of June the caterpillar ceased eating, and the next morning was found fastened to the floor of the cage by a silken girth.

At 10 p. m., June 15th, it changed to a chrysalis. To the naked eye this was a pitchy-brown, with the sutures between the abdominal segments red. Under a microscope the surface was seen to be covered with a raised reticulation and sparsely clothed with short hairs, while the colour was dull reddish-brown, profusely sprinkled with pitchy-brown spots and irregular blotches less numerous, and further apart on the wing-cases than elsewhere.

On Feb. 4th, 1904, this chrysalis produced a ♂ *Incisalia Augustus*.

The caterpillars of *Augustus* hitherto described have been carmine-red or pink (see Scudder's Butterflies of the Eastern U. S. and Canada, and Entomological News, Vol. XV., p. 107), and it is to be noted that these larvæ have all been found in the Sierra Nevada range. The larva here described was found about two miles west of Albany, N. Y., and at no stage of its existence while in our possession did it show any trace of colour other than that which marked it at first. Is the discrepancy to be explained on the ground of variation among the larvæ—geographical or otherwise—or is it possible that the eastern and western forms are specifically distinct?

[*Thecla iroides*, which is thought by some to be a western representative species of *Augustus*, has been reared from larvæ found feeding on young apples in June, 1897, near Victoria, on Vancouver Island, by Mr Carew Gibson, but no description was taken of the larvæ.—Ed. C. E.]

NEW TORTRICIDS FROM KASLO, B. C., AND THE NORTHWEST.

BY W. D. KEARFOTT, MONTCLAIR, N. J.

(Continued from page 114.)

Enarmonia Cockleana, sp. nov.—Palpi pale fawn, tipped with black. Front of head or face very pale fawn, top of head and thorax a shade deeper. Fore wing rich reddish chocolate brown, by refracted light, scales prismatic, like burnished copper. A broad fawn-coloured fascia from costa at inner third obliquely to dorsal margin beyond half. A second oblique fascia parallels the first, begins on costa at outer two-thirds, and ends at anal angle; this is broader on costa, and lower half is not so well defined. The inner fascia is nearly straight on inner margin, which is sharply defined by a line of shining pearl-white scales, interrupted three times; the outer edge of fascia is indented by four similar pearl-white patches projecting outward over the brown ground colour. The upper pearly-white spots do not touch the costa, but the lower ones are on the dorsal margin. The outer fascia is not so conspicuous as the inner. On its inner edge is a line of pearly-white scales beginning on the costa, interrupted the middle of its length, and terminating just above the anal angle. On its outer edge is a small pearl costal spot, below this a short vertical streak. Just before the outer margin is an irregular row of five small pearly-white spots. The last named and the lower streaks on outer fascia have a metallic blue reflection. The base of wing to inner fascia and the space between the two fasciæ is thickly sprinkled with fawn-colour scales. Costa, to outer fascia brown, sprinkled with fawn, with four pure white dashes or patches beyond; the first is geminate, and with the second, is in the outer fascia, the third makes an extension of this fascia, and the fourth between third and apex. The fourth is narrowly lined before and beyond with black, and on it is the upper of the submarginal row of pearl-metallic-blue dots. Costa between third and fourth white patch and beyond latter to apex is black. Beneath this black, at apex, is an ovate spot of ochreous-brown, enclosing a darker brown dot. Cilia white below apex to middle, below this and around anal angle fuscous. Hind wing and under side both wings dull metallic dark fuscous, or dark-coppery-fuscous. Cilia lighter. Abdomen, upper side dark shining gray, anal tuft yellowish brown or fawn, under side same as tuft. Legs same. Tarsi with dark annulations. Alar exp., 12 to 13 mm.

Twenty-eight specimens, twenty-six collected and bred by Dr. Dyar, Kaslo, B. C. Larvæ June 17, on willow, issued and flown specimens July 25; and two specimens taken by Dr. Barnes, Aug. 9, Banff, Alberta. U. S. Nat. Mus. Type No. 7787.

Named in honour of Mr. J. W. Cockle, the enterprising and indefatigable collector who is making Kaslo famous.

Acleris Britannia, sp. nov.—Head light brownish fuscous, tips of scales shaded with deeper brown. Palpi fuscous, beneath and inside, brown outside. Antennæ fuscous beneath, reddish brown above. Thorax ochreous brown, with scales arranged in a tuft. Fore wing ochreish-brown. Costa at base dark brown. A faint brown outwardly-curved oblique line begins at costa at about one-fifth, touching dorsal margin at one-quarter. Parallel to this line is a second brown line, beginning on costa at two-fifths and touching dorsum just beyond middle. The space between these two lines is paler than the balance of wing, forming a well-defined oblique fascia. The usual triangular costal patch begins at this second line, and is unusually large and dark. It extends along costa to but not touching apex, more than half length of costa, and the lower point nearly to centre line of wing; colour of patch rich dark coppery brown, roughly arranged in parallel oblique rows, between the rows brownish fuscous; heavily overlaying the patch are clusters of dark gray scales. These are particularly grouped at the lower point, just beyond inner point, and before outer point, and a row of dots below but not on costa. The costa along the patch is paler. Tips of scales, on outer margin, overlapping, cilia are darker brown, forming a fine marginal line.

There are a number of dots of black raised scales; the largest and highest is just above dorsum, on the inner of the above parallel lines, on the outer of these lines five or six small clusters, the cluster in centre the largest, the lowest one is on the dorsal margin, another small dot is just beyond this and just above the dorsal margin. Seven small clusters form an acutely outwardly curved line, its upper end beginning in the dark costal patch about half way between the lower and outer points of the patch, and curving outward towards outer margin, thence evenly and regularly curving to the anal angle. Another dot is below outer end of costal patch and before apex. The ground colour of the fore wing is more of a tawny yellow than ochreous brown; under a low-power lens the ground colour is seen to be a series of wavy lines, alternately tawny yellow and a lighter cinereous yellow. These lines are generally parallel and

oblique. They are an entirely independent ornamentation to the lines, spots, etc., in above general description. Cilia same as ground colour, tinged with fuscous, and bordered on the inner side by a thin brighter line. Hind wing very pale ash gray, with a reticulated effect on the outer half, and especially the apical third, caused by a series of parallel brownish fuscous lines, broken into short dashes. Cilia long, concolorous. Under side, fore wing shining fuscous, with the lines and dots of upper side repeated by darker fuscous. On the inner half of costa are several oblique dark fuscous dashes. Cilia concolorous, shading into brown at extreme edge and apex. Under side, hind wing same as upper side. Abdomen fuscous. Legs fuscous, annulated with dark fuscous on last joint.

The type described above is like the majority of the specimens before me. Two extremes may be noted.

In one, A, the costal patch is so heavily overlaid with nearly black, slate-coloured scales, that the ground colour is entirely hidden, except a line along the costa, and a small enlargement of this line in the middle of the patch.

In another, B, the general colour is lighter all over, with barely a trace of the dark slate scales in the patch. In this specimen the wave-like lines of the ground colour are not nearly so well defined, but the lighter and darker scales are broken up into small patches; one is particularly well marked, near base on dorsum, and surrounding the large dot of black raised scales.

The general appearance of all specimens is much the same, these differences only becoming prominent through a lens. Alar exp., 17 to 19 mm.

This species is close to the European *Acleris aspersana*, Hbn., but is quite distinct, especially larger average size, pair of basal lines absent in *aspersana*, and hind wings of latter are evenly smoky fuscous, no lines or reticulations.

Described from 23 specimens, 16 from Kaslo, B. C., collected by Dr. Dyar, also bred by him on rose, and 6 specimens collected by Dr. Taylor and one by Theo. Bryant in the vicinity of Wellington and Victoria, B. C. I have also seen one specimen in the Museum of Comp. Anat., Cambridge, labelled "B. C.," and I have so named it after British Columbia.

Larva taken July 21. Moths emerged and dates of capture, July 31 (Bryant), Aug. 20 (Taylor), and Sept. 5 (Dyar).

U. S. Nat. Mus. Type No. 7784.

Acleris fragariana, sp. nov.—Head and palpi dull smoky black, tips of scales gray, giving a mottled appearance, prothoracic legs and under side of thorax the same; the gray colour predominates on inside and under side of palpi. Thorax, patagia and fore wings yellowish brown. Scales on thorax long, arranged in a well-defined tuft. Fore wing: the inner half, including the base, is of ground colour, mottled by four evenly spaced, transverse, narrow, interrupted bands of a shade darker brown. The dorsal margin, within this space, beginning just beyond the base, is overlaid with dark blue-gray scales, formed into short vertical bars, between the bars the ground colour is darker brown. This dorsal band extends out to anal angle, but merges beyond the middle with the darker outer half. The latter is sharply defined by line beginning on costa, just before the middle to the dorsum, oblique and curving slightly outwards. The lower two-thirds of this line is of darker brown raised scales. Adjoining this line outwardly is a band of mixed rust brown, gray-blue and dark brown scales; in this band, where it touches costa, are two small dark brown costal spots; this oblique band continues down and merges into dorsal dark band; beyond this band on the costa is a small triangular patch of ground colour scales, with a short oblique streak of dark brown on costa just before outer end of patch. Beyond this on costa, and just before the apex, is an almost circular patch of dark gray-blue scales, bounded by short raised scales tipped with black. Below this circular patch the general colour is lighter, the lighter colour circling the patch on outer side and running up to costa at apex. Beginning at apex and continuing to outer margin, just above anal angle, is a perfectly straight vertical line of black raised scales, interrupted by a short break one-third below costa; and opposite this break, closer to outer margin, is a short line of the same scales, slightly overlapping the inner line at the lower end, and continuing up to apex, roughly margining the cilia. At the inner third, just above dorsal margin, on lower median line, is a large cluster of raised scales, dark brown mixed with black; above this, a little nearer to base, on median line, is a small cluster of brown raised scales, with a black dot in centre; a third small cluster is between these two, but a little beyond them. These three clusters are all on the inner yellowish-brown half of wing, the first mentioned and largest resting on the dark dorsal band. Cilia long, mottled light and dark brown at apex, with a scale or two of black. This colour continues to middle of outer margin, where it gradually

merges into blue-gray, which latter colour is solid at and around anal angle. A faint line of this gray runs up through centre of cilia to apex. Hind wing shining light fuscous, cilia same. Under side fore wing: inner half pale yellowish brown, lighter than upper surface; outer half light lead colour, a dark brown, short, oblique dash on costa at inner fourth, and a small black dot at middle of costa. Apical portion of under side and cilia mottled with brown, and the colour of the raised scales of upper side are repeated. Under side hind wing very light fuscous, marked by a few brownish black broken lines, paralleling outer margin, in apical and costal regions. These lines are faintly visible from the upper side. Abdomen: above shining fuscous, anal tuft faintly tinged with brown; under side same, but a shade darker. Meso- and metathoracic legs dark gray on upper joints; outer cinereous, annulated with dark brown. Alar exp., 14 to 15 mm.

Described from four specimens, bred on strawberry, at Ellensburgh, Wash.; forwarded by S. W. Maxey, through F. H. Chittenden. Issued Aug. 22.

U. S. Nat. Mus. Type No. 7785.

Commophila fuscodorsana, sp. nov.—Head white, shaded with brown on the sides. Palpi and thorax white. Fore wing pure white, except basal patch and band on dorsal margin, nearly one-third width of wing, extending two-thirds length of wing, and at outer end merging into a patch covering lower end of cell, greenish fuscous; overlaid along dorsal margin with striations of pearly white. On the extreme dorsal edge the fuscous is interrupted by a row of pure white dots. At apex are two short rounded lines of dark greenish fuscous, one margining the cilia and one paralleling it just before apex, both touching costa. On the costa at middle of wing are two pale greenish dots, below these a shade of light yellow, running into or forming a continuation of the fuscous patch terminating the dorsal band. The faint vertical streaks of very pale greenish fuscous traverse the white outer third between the dorsal fuscous patch and apical lines. Cilia white, except at apex, fuscous. Hind wing light fuscous, cilia paler. Under side fore wing smoky fuscous, darker at apex; hind wing light fuscous. Abdomen yellowish fuscous, anal tuft lighter, legs same. Alar exp., 18 mm.

Described from two ♂ ♂, one Kaslo, B. C., June 7, J. W. Cockle; one Fieldbrook, Cal., May 21, H. S. Barber.

Type, U. S. Nat. Mus., No. 7876.

THE CRICKETS OF ONTARIO.

BY E. M. WALKER, B.A., M.B., TORONTO.

The crickets, or Gryllidæ, like the other families of Orthoptera, have received so little attention from Canadian entomologists that very few species have been reported from the country, and most of these few records are of little value, as they were made at a time when the family had been little studied, and the species were ill defined. Much has been done of late, however, by American entomologists, notably Scudder and Blatchley, to unravel these difficulties, although the family is still a very difficult one to deal with, and much patience and close observation is necessary in order to separate the species satisfactorily. As the writer has paid a good deal of attention to the Orthoptera for the past ten years, a number of species of crickets have been added to the Ontario fauna, and the following notes upon these species may serve as a guide to the further and more complete investigation of the species of Gryllidæ in this part of the country.

Briefly, the Gryllidæ may be characterized as follows: They are jumping Orthoptera, in which the body is more or less depressed. The wing-covers lie flat upon the dorsal surface of the body, with the outer part bent abruptly downwards at the sides. The tarsi are 3-jointed, without pads between them, and the fore coxæ are longer than broad. The antennæ are usually long and filiform; the hearing organ, when present, is situated at the base of the fore tibiæ, and the shrilling organ of the male is near the base of the tegmen, and is longer and broader than in the Locustidæ. The ovipositor when exposed is long and spear-like, and apparently consists of two lateral pieces, grooved internally. Each of these pieces, however, is made up of two separate parts closely fitted together. A tube is thus formed, down which the eggs are passed during oviposition.

Three subfamilies of Gryllidæ are represented in Ontario, the Gryllotalpinæ or mole crickets, the Gryllinæ or ground crickets, and the Œcanthinæ or tree crickets. These subfamilies may be separated by the following table, which, with the succeeding ones, has been taken from Blatchley's excellent report on the Orthoptera of Indiana (27th Ann. Rep. Dep. Geol. Res. Ind., 1902), such changes having been made as were necessary to adapt them to the Ontario fauna. I am also indebted to Mr. Blatchley for the loan of specimens, and for his kind assistance to me in the determination of difficult species.

Subfamilies of Ontario Gryllidæ.

a. Fore tibiæ enlarged, fitted for digging; female without exposed ovipositor (Mole and Sand Crickets) ..... Gryllotalpinæ.

aa. Fore tibiæ not enlarged; female with well-developed external ovipositor.

b. Hind tibiæ rather stout, armed with stout spines, without teeth between them (Ground Crickets)..... Gryllinæ.

bb. Hind tibiæ slender, armed with delicate spines, with minute teeth between them (Tree Crickets)..... Œcanthinæ.

Subfamily GRYLLOTALPINÆ.

Two genera are represented in Ontario, each with a single species.

1. GRYLLOTALPA BOREALIS, Burm. The Northern Mole-Cricket.

G. borealis, Burm. Handbuch der Ent., II., 1838, 740.
G. brevipennis, Serv. Hist. Nat. des Ins., 1839, 368.
G. columbia, Scudd. Mem. Peabody Acad. Sc., 1, 1869, 26.

This insect cannot be mistaken for any other Canadian species. It is a large seal-brown insect, about 30 mm. long, with enormously dilated fore femora and tibiæ, the latter with the tarsi forming a sort of hand very like the fore foot of a mole in appearance, and similarly adapted for burrowing. The hind legs are short and not fitted for jumping, and this alone serves to distinguish it from all our other Gryllidæ.

This species has been taken at Leamington, Essex Co. (Fletcher, An. Rep. Ent. Soc. Ont., 1892, 87), but as I have never met with it in the field, I have nothing to add to the published accounts of its habits. These have been dealt with in a very interesting manner by Dr. Fletcher, under the above reference, and also by Blatchley in his recent work on the Orthoptera of Indiana.

2. TRIDACTYLUS APICALIS, Say. The larger Sand Cricket.

T. apicalis, Say. Journ. Acad. Nat. Sc. Phil., IV., 1825, 310.
Xya mixtus, Hold. Proc. Acad. Nat. Sc. Phil., VI., 1853, 364.

Length of body, 9.5 mm.; pronotum, 1.75 mm.; tegmen, 2.7 mm.; hind femur, 4.5 mm.

This little insect much resembles a diminutive mole-cricket in appearance, but differs in having greatly swollen hind femora, and in the fore tibiæ, which are much less expanded, and bear three or four spines at the apex. The antennæ are extremely short for a cricket, being shorter than the pronotum. The tegmina cover about half the abdomen, and the wings project slightly beyond the tip of the abdomen.

I first came across this interesting little cricket on Sept. 21, 1895, when I found two specimens on the borders of a small pool near the Humber River. The pool was on sandy soil, and supported a large number of aquatic insects and other animals. Since then I have taken it at several different localities near Toronto, usually on the sandy margins of streams. On June 25, 1901, I found it in considerable numbers on a certain part of the margin of a small stream near York Mills, Ont., a few miles north of Toronto. Here they were to be found upon the damp sand a few yards from the water's edge, and when approached would leap vigorously. They never flew more than a few yards, however, and were fairly easily "marked down" on account of the bareness of the sand. They were often seen peeping from their burrows, into which they would immediately retreat on being approached.

The spot where these crickets were found extended only some 15 or 20 yards along the margin of the stream, and although the banks were explored for half a mile or more, and many other spots of similar character passed, no more specimens of the insect were seen.

(To be continued.)

The notes on "Spring Methods of *Telea Polyphemus*," in the April, 1904, number of CANADIAN ENTOMOLOGIST, were very interesting, and recalled to my mind a cocoon of this insect sent me from South Carolina in 1899, securely fastened to a twig by a silk wrapping running up the twig, after the same manner as *cynthia* and *promethea*. Among the many cocoons of *polyphemus* taken in various parts of New Hampshire, I never saw one suspended in this manner, and had hitherto supposed my Carolina specimens to be entirely exceptional. Mr. Cockle's suggestion, that the habit of suspending the cocoon may have a relation to the climatic conditions and be of advantage in regions where there is no continuous snow-carpet in winter, may be found to hold true. It would be interesting to hear from other localities on this question.

F. H. FOSTER, Claremont, N. H.

LITHOBII FROM CALIFORNIA: A CORRECTION.—In my paper on "Lithobii from California and Oregon," published in the Proc. Phil. Acad. for 1903, page 152, a peculiar transposition of part of the key to species occurs, this having been overlooked in the reading of the proof. The two species, *Aztecus* and *Chumasanus*, in the key are placed in division a, of series A, with forms having the coxal pores in several rows. As is evident from the statements in the key itself, and from the descriptions of *Chumasanus* following it, these two species belong in series B, division a, the coxal pores being in a single row. R. V. CHAMBERLIN.

NOTES ON GENERIC CHARACTERS IN THE LYCOSIDÆ.

BY RALPH V. CHAMBERLIN, ITHACA, N. Y.

Scarcely any two men who have studied the *Lycosidæ* have interpreted or defined the genera of the family wholly in the same way. The purely relative nature of the characters most frequently used in separating the species into genera leaves room for much diversity in opinion and usage; and, in consequence, it is not surprising to find that genera used without question by one arachnologist are by others unhesitatingly relegated to synonymy.

Various genera that have been proposed in this family are clearly artificial, having been erected on single characters without reference to the existence or non-existence of correlated differences. That is, the species in such cases are grouped with a view to convenience rather than with the intent to express generic relationship. There can be little doubt, however, that some of the more commonly accepted genera represent in the main natural associations of species, the difficulty here being encountered in the choice of characters for definition and diagnosis.

It is true that *Pardosa*, for example, may promptly be recognized by an experienced student of the group from the shape of the face and the relations of the eyes of the first and second rows, but no statement of their features has been given that does not become uncertain somewhere, and restriction to them in study has led authors to the incorrect reference of many species. The difference between *Lycosa* and *Pardosa* in the armature of the furrows of the cheliceræ, pointed out by Mr. Simon, will also often not hold good. It is sometimes stated that in *Pardosa* and its relatives the metatarsus is longer than the combined length of the tibia and patella of the same leg, whereas in *Lycosa*, etc., the reverse is true, but exceptions to this are not rare on either side; and so it is likewise with other characters which might be selected singly.

The labium in its form and proportions affords characters of considerable significance. It has been stated that the labium of *Pardosa* and its close allies is nearly always wider than long, and that it is never longer than wide, whereas in *Lycosa* it is always longer than wide. For the use of this distinction very careful measurement is essential. The value of the character I find to be increased and its use made safer by considering in connection with it the shape and relative length of the articulating notch or excavation at the base of the labium. In *Pardosa* the notch is short, averaging one-fourth, or less, the total length of

the labium. In *Lycosa* the excavation is relatively long, usually one-third the total length of the labium. In *Pirata*, in which the labium is longer than wide, as in *Lycosa*, the notch is shorter than in either of the two preceding genera, varying between one-fourth and one-fifth of the length of labium, with the average toward the lesser limit.

It is my opinion, however, that the clearest and most definite characters for limiting the more important genera of *Lycosidæ* are presented in the structure of the copulatory organs, especially of the male, although slight use has been made of them in such connection heretofore. In a more extended paper, to appear later, I shall give a detailed treatment of the structure and homologies of the reproductive organs in this family, with application to the arrangement and classification of its American members. In the present place are presented only a few notes on the structure of copulatory organs in the commoner genera *Lycosa*, *Pardosa* and *Pirata*, although other genera might be used equally well so far as concerns the validity of the points it is desired to make.

Van Hasselt*, who uses the term "epigynum" as applying strictly to the median piece or "process" of the female genital plate, attempts to establish with respect to its structure and functions in the *Araneæ* several theses, the more essential of which are certainly not true for the *Lycosidæ*. Thus in no degree whatever in this family can the median body, when such is present, have any mobility independent of the whole epigynum "*avec érection in longuer et flexibilite latérale*," and cannot be considered "*du moins fourtionellement comme analogue a l'ovipositor de quelques Insectes*," such as could be used in arranging eggs in a cocoon. The median body here is simply a ridge-like elevation of the floor of the depressed area of the plate.

In most cases at or near its posterior end the median ridge is extended transversely on each side to the marginal walls, which they meet immediately behind the openings of the receptacula. The ridge thus divides the epigynal depression into two furrows or channels, each of which leads to the opening of the receptaculum of the corresponding side. Posteriorly the free ventral edges or the septal elevation and its transverse arms are produced out horizontally to a varying distance over the lateral channels, the median piece thus being in effect grooved along its sides. Sometimes these plate-like extensions are very wide, and may cover over most of the epigynum behind, as is the case in *Pardosa Californica*, Keys.

*Vid. "L'Epigyne des Araignees Femelles," Tids. v., Ent., Vol. 35 (1891-'92), pp. 87-121. Pls. 7-9.

The lateral plates are mostly thin and partially transparent, the result often being an appearance confusing to one not understanding their structure, especially so when the epigynum is examined in a liquid medium. Various published drawings of epigyna represent the septum as narrowest at the free surface and gradually broader and broader toward the base or dorsal part in cases where the free edge in reality is widely extended horizontally over the basal portion.

The function of the median body, or variously termed "process," "ovipositor," "finger," etc., seems clearly to be that of a guide to the male embrolus, controlling the course of the latter and facilitating its entrance to the spermatheca. Intimately associated with specific and generic differences in the epigynum are naturally corresponding differences in the male palpus. The unusual structure of epigynum in *Lycosa pulchra*, Keys (=*L. Kochii*, Keys, of Em., Banks, etc., but nec., Keys; =*L. Purcelli*, Montg., the true *Kochii* being a western species), is matched by an equally, if not more, peculiar palpus in the male. The characteristic epigyna of *L. ocreata*, *gracilis* (=*verisimilis*, Montg.), *bilineata* and their allies (group *Schizogyna*), are likewise associated with correspondingly peculiar palpal organs.

The epigyna in the genus *Pardosa* agree in having the depressed area relatively large and deep on each side adjacent to the opening of the receptaculum, the depression anteriorly becoming narrower and shallower, usually strongly so. The depression in front, in fact, is often but slightly indicated, although ordinarily more developed at its extreme anterior end than in the region immediately posterior to that part. The guide frequently quite fades out in front of the middle, leaving the depression anteriorly undivided (*P. lapidicina*), and in other cases it is relatively but weakly indicated in that region. Sometimes the depth and width of the furrows increase very gradually from in front posteriorly, as they do in *P. nealota* (an undescribed Texan species allied to *littoralis*), but leaving the guide narrower anteriorly. In other forms the deeper posterior areas or foveæ may be formed abruptly, as is very conspicuously the case, for example, in *P. sternalis* and *P. atra*. The posterior foveæ may be relatively very large, with the shallower front region much reduced (*Groenlandica*, *brunnea*) or relatively small (*sternalis*, *atra*). In *xerampelina*, Keys (=*tachypoda*, Th., and *Montana*, Em., etc.) the transverse arms of the guide are but weakly developed, and the median septal part widens conspicuously anteriorly.

In *Lycosa*, conditions as to the median depression are nearly the reverse of those found in *Pardosa*, the furrows being deepest and widest at

the front, and becoming shallower and narrower posteriorly in the region of the spermathecal openings. The narrowing of the furrows is produced principally by the bulging inward of the side ridges of the epigynum, the posterior face of the tubercle so produced usually being close to and parallel, or nearly parallel, with the corresponding transverse arm of the guide. Sometimes the lateral plates of the guide extend over the narrowed channels behind in such a way as nearly completely to roof them over. In most cases the tubercles are conspicuously more elevated than the depressed posterior ends of the lateral ridges which embrace the ends of the arms of the guide. The form of epigynum typical of the genus is well presented in *L. helluo* (*nidicola*, Em., etc.), *riparia* and related species. From this form the epigyna of other species depart in varying degrees.

The epigyna in the genus *Priata*, as also in the American species *(funerea, evagata)* of *Tricca (Anocosa)*, present no distinct guide, although they are sometimes weakly furrowed. In no case is any transverse restraining ridge developed. The spermatheca practically always open free each upon the inferior or the inner face of one of two posteriorly-directed tubercles, between which is an open space or excavation. The tubercles may be separated by a rather narrow space, as in *insularis* and *agilis* (=*wacondana*, recently described by Mr. Scheffer), may be more widely divergent, as in *priatria*, Cl. (Em.), or may be scarcely evident, leaving the posterior margin of the epigynum nearly straight, as in *Montana*. The *Priata* type of epigynum is very similar to that of some *Agalenidæ*. The species described by Mr. Tullgreu, from Florida, as *Pardosa bilobata*, which has an epigynum of this kind, is, there seems scarcely room for doubt, a *Pirata* (probably *insularis*, Em.).*

The bulb of the male palpus consists of an upper lobe folded more or less transversely upon a larger and more protruding basal division, in which is contained all but the apical portion of the coiled semiferous tube. The slender terminal portion of the tube passes forward into and opens near the end of the intromittent organ, the *embolus* or *style*. The embolus arises toward the upper and inner side, near the base of the anterior lobe, and in rest lies more or less transversely across the bulb, either in a fold of the apical lobe itself (as usual in *Pardosa* and *Priata*) or upon a special fold developed along the front margin of the basal lobe *(Lycosa)*. This special fold, which may be termed the *lectus*, in *Lycosa* is produced at the end into a lobe of varying size, which normally bends forward at the margin of the alveolus, and which supports during quiescence the terminal portion of the embolus. This apical lobe or auricle may be long, and may extend forward along the side of the *conductor emboli*, to be mentioned later, even to the front margin of the alveolus, as it does in *L. ocreata*, *bilineata*, etc.

*Vid. A. Tullgreu, "Spiders collected in Florida by Dr. Einar Lönnberg," Vet. Akad., Handl., B. 27, Afd., IV., No. 1 (1902), p. 22, fig. 12.

(To be continued.)

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REV. C. J. S. BETHUNE,

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1904.

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LEPIDOPTERA.—450 Cynthia, 50 Polyphemus and 50 Cecropia cocoons to exchange for Lepidoptera of Boreal America. FERDINAND GOEBEN, 464 Atlantic Ave., Brooklyn, N. Y.

WILL COLLECT Hymenoptera, Diptera and Neuroptera of Oregon during season of 1904, in exchange for Lepidoptera of the world. EDWIN V. LANSING, JR., Salem, Ore.

WANTED.—Lepidoptera of Canada, in papers with data, in exchange for British Lepidoptera, in papers with data, during the coming season. Acidalidæ and Pluslidæ especially desired. RALEIGH S. SMALLMAN, Carlton House, Herne Hill, London, S. E. England.

WANTED.—Material for the study of the hybrid or polymorphic butterflies of the genus *Basilarchia*, including larvæ or pupæ of *arthemis* or *astyanax*, imagoes of *proserpina* or *arthechippus*, or any specimens showing unusual characters. Liberal exchange. Specimens retained will be deposited in Museum of Comparative Zoology. W. L. W. FIELD, Milton, Mass.

MOTHS OF PENNSYLVANIA AND NEW JERSEY.—The undersigned will give good exchange, in cash or specimens, for moths of Pennsylvania and New Jersey that are new to his collection. Send list of rare species only. PHILIP LAURENT, 31 East Mt. Airy Ave., Philadelphia, Pa.

WANTED.—Various species and varieties of the genus Eubaphe (Crocota). *Other* Lepidoptera also desired, especially mounted specimens. Send lists to A. KWIAT, 701 Larrabee St., Chicago, Ill.

The Canadian Entomologist.

VOL. XXXVI. LONDON, JUNE, 1904. No. 6

NEW NOCTUIDÆ FOR 1904.—I.

BY JOHN B. SMITH, SC.D.

Noctua dislocata, n. sp.—Ground colour bluish, ash-gray, marked and more or less suffused with reddish. Head gray, tending to reddish on the vertex; palpi deep brown at the sides. Thorax mouse to fawn gray or reddish, immaculate. Primaries in a general way are gray to the middle of the wing and reddish beyond; but they may be an even reddish-gray throughout. All the normal maculation is present, but not contrasting. Basal line geminate; but the outer line is obscure and only the inner is dark brown and obvious. T. a. line narrow, brown, single, preceded by a narrow paler line, just a little outcurved between the veins and a little outcurved as a whole. T. p. line geminate, about parallel with the outer margin; the inner line narrow, brown, somewhat irregular, tending to lunulate; the outer is obscure, more even and sometimes marked only by the difference between the gray-included space and the reddish brown s. t. space. S. t. line pale and a little irregular, as a whole nearly parallel with the outer margin. A series of small dark terminal lunules which may be obliterated. Median shade line starts from about the middle of costa, darkens the space between the ordinary spots, then runs from the bottom of the reniform close to and parallel with the t. p. line to the inner margin. As a rule the terminal space is grayish, or, at least, lighter in colour than the s. t. space. Claviform just indicated and very small. Orbicular large, gray, oval, open to the costa, usually defined by gray scales. Reniform of good size, kidney-shaped, incompletely outlined and not relieved. Secondaries yellowish at base, smoky toward outer margin, where a dusky terminal line relieves the reddish fringes. The discal lunule and outer line of the under side are usually indicated above. Beneath, smoky with a reddish tinge, which is best marked at the margins, secondaries more yellowish except along costa; both wings with a dusky extra median line, secondaries with an obvious discal lunule.

Expands 1.25–1.40 inches = 31–35 mm.

Habitat.—Calgary, head of Pine Creek, in July, F. H. Wolley Dod.

Four ♂ and two ♀ examples are at hand. The species resembles *Calgary* at first sight, but differs in that the median shade line is dislocated on the median vein and, instead of continuing an even course across the wing, resumes it below the reniform and runs close to the t. p. line. There are other superficial differences and the genitalic structure is distinctive; but the character just pointed out should enable the species to be recognized.

Euxoa pestula, n. sp.—Ground colour a dull smoky luteous, more or less powdered with bluish-gray, brown and black; but never so as to obscure the luteous base. Head with a dark frontal and inter-antennal line, the dark shade ranging from brown to black. Collar with a somewhat obscure brown or blackish median line, surmounted by a distinct or even prominent gray line. Thorax not otherwise definitely marked. Primaries with all the normal maculation well defined, though not prominent, and in some examples there is a distinct ferruginous dot or spot at the insertion of the costal margin of primaries. There is no basal dash or mark below the median vein. Basal line distinctly geminate, blackish, included space a little paler than the ground. T. a. line geminate, blackish, a little outcurved in the interspaces and, as a whole, a little outwardly oblique. Included space of the ground colour or a little paler. T. p. line geminate, not very well defined, inner portion more or less lunulate, outer more even and tending to form a series of venular points. As a whole, abruptly bent on the costa, outcurved over the reniform and then nearly parallel with outer margin. S. t. line pale, a little irregular, preceded by a dusky costal patch and an ill-defined dusky shading, followed by a terminal space, which is darker, except at apex. Median shade line distinct, though scarcely prominent. It is single, starts from costa between the ordinary spots, bends to the base of the reniform, then runs parallel with and close to the t. p. line. Claviform rather small, outlined in dark scales, not otherwise contrasting. Orbicular oval, oblique, open to the costa, gray-filled, not otherwise well defined. Reniform large, only a little lighter than ground; kidney-shaped, tending to a pale annulus. Secondaries yellowish at base, smoky toward the outer margins. Fringes white, or whitish with a dusky interline. Beneath smoky, secondaries paler and more powdery, both wings with an incomplete outer line and a small discal spot.

Expanse, 1.25–1.50 inches = 31–37 mm.

Habitat.—Calgary, Alberta, July, August and September, F. H. Wolley Dod.

Twenty examples, representing both sexes in almost equal numbers. The relationship is to *messoria* because of the obvious median line; but also to *tessellata* because the space between the ordinary spots is darkened. It is one of the group containing *incubita*, *terrenus* and *pleuritica*; differing from each as much as they do from each other.

Mamestra obesula, n. sp.—Ground colour a somewhat luteous gray, more or less shaded with reddish gray and smoky brown. Head with brown or blackish frontal line; collar with median and subapical black lines; patagia with black or brown submarginal line; disc a little discoloured, tufts well marked. Primaries with all the ordinary markings well defined, but so broken and shaded as to seem confused. Basal line black, geminate, included space pale, dislocated on the median vein. T. a. line geminate, black, the two portions almost equally defined, included space of the palest ground; as a whole a slight outcurve, only a little indented on the veins. T. p. line geminate, obscure, inner portion a little lunulate, outer almost even; as a whole it is abruptly bent on the costa, a little curved over the reniform and somewhat drawn in below. There is a narrow, obscure, median shade line which crosses obliquely between the ordinary spots and afterwards continues from the bottom of reniform, close to the t. p. line. S. t. line pale, somewhat contrasting, preceded by sagittate black spots, strongly indented on veins 3 and 4 and again below the apex, forming in the first case a conspicuous, pale W. A series of black terminal lunules. The long fringes are interlined, a little notched, cut with whitish opposite the veins. Claviform rather broad and short, black margined, filled with smoky, forming a conspicuous feature. Orbicular round or oval, oblique, pale ringed, dark centred, an oblique paler shading, continued behind the claviform to the t. p. line. Reniform large, upright, a little drawn in centrally, more so from outside, narrowly pale ringed, dusky-filled. Secondaries pale yellowish to a broad blackish margin. There is a smoky discal lunule, a narrow smoky line before the broad margin, and the fringes are yellowish. Beneath, reddish gray, powdery, each wing with a blackish discal mark, a smoky median line, a dusky s. t. shading before a pale terminal space, and a series of small terminal lunules.

Expands 1.20–1.32 inches = 30–34 mm.

Habitat.—Calgary, Alberta, head of Pine Creek, July 20, 22, and August 5, F. H. Wolley Dod; Denver, Colorado, July 8.

One ♂ and three ♀ ♀ are now before me. The species is in a way intermediate between *M. Farnhami* and *M. trifolii*, having the colour contrasts of the former, with the build and maculation of the latter. The specimen from Denver has been doubtfully associated with *Farnhami* for some years; but until I received specimens from Calgary I did not feel safe in determining it as distinct.

Mamestra Dodii, n. sp.—Ground colour lilac-gray, more or less suffused with reddish brown. Head concolorous. Collar with a more or less obvious brown median line. Thorax almost fawn-gray, not obviously maculate. Primaries in a general way are gray in the basal and s. t. spaces, and at the apex; reddish or brown along the costa and in the median space, the darkest portion between veins 1 and 2 and over the claviform; but no two examples are alike in the relative distribution of the shadings. Basal line obscure, gray, not defined by darker lines. T. a. line geminate, defining lines narrow, included space gray; outcurved in the interspaces and outwardly oblique. T. p. line gray, defined by the dark median space and by a following dusky shading. S. t. line pale, forming a small *W* on veins 3 and 4, preceded by a brown line or shade, sometimes entire, sometimes broken up into spots. Terminal space narrow, brown except at apex. A narrow, brown terminal line. The long brown fringes are cut with gray on the veins. Claviform black marked, broad at base, narrowed to a point near, but not quite at the t. p. line. Orbicular oblique, varying in size and in the ground; always at least gray and sometimes contrasting; sending an oblique gray shade across the median space above the claviform. Reniform upright, of moderate size, a little constricted, not well defined, reddish marked in upper portion. Secondaries pale smoky yellowish, with a diffuse, broad outer margin, yellowish fringes and a smoky discal lunule. Beneath, smoky to yellowish-gray, powdery, all wings with a discal lunule and an outer shade band, which is diffused and variable in the specimens.

Expands 1.25–1.50 inches = 31–37 mm.

Habitat.—Calgary, Alberta, head of Pine Creek, June 21, 22, 2[illegible], July 4 and 7; mouth of Fish Creek, July 7, Mr. Dod; Bullion Par[illegible], Colorado, July 27.

Seven males and one female are at hand, no two alike, yet obviously one species, resembling *Tacoma* and *rugosa*. I had, in fact, considered

the species to be a form of *rugosa*; but Sir George Hampson, to whom specimens were sent, declared this to be an error. Mr. Dod thereupon kindly sent additional material, and I secured typical *rugosa* from Maine and New Brunswick for comparison. The result is this description, which I believe characterizes as good a species as any in the genus. *Rugosa* is a smaller, less irrorate, more sharply-defined species, with ordinary spots of different form, s. t. line hardly indented, costal region gray, and colour of secondaries more decidedly yellow.

Mamestra acutermina, n. sp.—Related to *Goodelli* in general characters; but is smaller, darker, the maculation barely traceable, the apex of the primaries distinctly better marked. Of the seven specimens before me, two have no relieved maculation at all, though the general ornamentation may be made out by careful scrutiny; three others have a little black mark at the end of the claviform, and in these it is sowewhat easier to determine the general markings. In the other two the ordinary spots are partly outlined by black scales, and the remainder of the ornamentation may be readily made out.

Expands 1.20–1.30 inches = 30–32.5 mm.

Habitat.—Calgary, Alberta, July 9, head of Pine Creek, Mr. Dod; Cartwright, Manitoba, Mr. Heath; Wellington, Brit. Col., July 17, August 24, Mr. Bryant; Volga, South Dakota, Mr. Truman.

Five males and two females. One male measures 1.20, another 1.30 inches; all of the others measure 1.25 inches. An equal number of *Goodelli* range from 1.35 to 1.50 inches; 1.40 being about the usual size.

Orthosia verberata, n. sp.—Ground colour varies from dull grayish to reddish luteous. Head and thorax immaculate. Primaries with all the maculation defined; s. t. space a little the darkest part of the wing, but not strongly contrasting. Basal line single, smoky, nearly upright. T. a. line single, narrow, smoky, outwardly angulate on costal, inwardly on median vein, outcurved in the submedian interspace and well bent out below the internal vein. T. p. line geminate, the inner part narrow, smoky, linear, the outer merely a darkening of the s. t. space, even in course, outcurved over cell, a little incurved below. S. t. line outwardly diffused, irregular, pale, preceded by a distinct reddish shade. There is a series of small, smoky terminal lunules. Median shade diffuse, smoky, outwardly bent between the ordinary spots so as to darken the reniform

inferiorly, then bent inward and darkening the outer third of median spac Orbicular round or nearly so, concolorous, defined by a narrow smo ring. Reniform moderate in size, kidney-shaped, outlined in brow concolorous, except for the leaden-gray lower end. Claviform inco pletely outlined by reddish scales, concolorous, reaches to the med shade, but is scarcely traceable in some examples. Secondaries with disc smoky, costal margin broadly, the others narrowly yellowish reddish. Beneath, yellowish to reddish, a little powdery, with a dis lunule and an outer smoky line on each wing.

Expands 1.35–1.50 inches = 34–38 mm.

Habitat.—Calgary, Alberta, head of Pine Creek, at treac September 17, 23 and 27, Mr. Dod.

Two males and two females, in good condition. Both the mal expand about 34 mm. and both the females about 38 mm.; but th proportion may not hold. The species is allied to *ferruginoides*, and one of several new forms worked out in the course of a revision of th genus which is now in progress.

Cucullia indicta, n. sp.—Ground colour bluish-gray, all th maculation vague. Head darker, smoky brown. Collar smoky at bas and with a blackish median line. Disc of the thorax smoky behind the tuft; but this is not contrasting. Dorsal tufts of the abdomen smoky Primaries almost concolorous. T. a. line barely traceable, with the usua long teeth. T. p. line marked by a geminate curved line in the sub median interspace. This is followed by a pale line and by a mor obvious blackish-brown line, which extends along below vein 2 to the oute margin. There is a broken, blackish terminal line. The ordinary spot are as in *postera*, but barely traceable. Secondaries dull yellowish-whit at base, smoky toward the outer margin and with a white fringe. Beneath dark smoky, disc of secondaries whitish, else immaculate.

Expands 1.80–2.08 inches = 45–52 mm.

Habitat.—Calgary, Alberta, South Fork of Sheep Creek, July 2 29, F. H. Wolley Dod.

One male and one female, the latter much the larger. I have also ♀ from Colorado which may be this species, but is not good enough t make the matter certain. The relation is with *postera*, but all the brow has disappeared, and the maculation is almost gone with it.

THREE NEW CECIDOMYIID FLIES.

BY T. D. A. COCKERELL, COLORADO SPRINGS, COLO.

Near Monument Creek, Colorado Springs, my wife and I recently came across an undetermined species of *Artemisia*, about three feet high, bearing many Cecidomyiid galls. The flies emerged from these galls on April 2, and, as the species is new, it is herewith described:

Diplosis Coloradella, n. sp.—♂. Length hardly 2 mm. Head black; thorax black, reddish posteriorly, mesothorax with rows of black bristles; legs reddish-brown, suffused with dusky; abdomen narrow, reddish passing into yellowish, with long lateral hairs, genitalia darker, terminal joint of forceps stout; wings with a very long fringe; first vein reaching costa about or very slightly below middle of wing; third vein reaching the margin at the apex of the wing, but the apex is subtruncate, rather bulging below, so that the most distal point seems a little below the end of the vein; fifth vein forked beyond its middle, but its distal half reduced to mere shadowy lines; antennæ reddish, 15 (2 + 13) jointed, joints cylindrical, slightly constricted in the middle, pedicillate with very long hairs, terminal joint subacuminate. The antennal joints are like those figured by Coquillett of *D. violicola*.

♀.—Head black; thorax and abdomen dull crimson, dorsum of thorax usually blackish or black, sides and apex of abdomen more or less variegated with pale yellowish; ovipositor when exserted scarcely two-thirds length of abdomen; antennæ 15 (2 + 13) jointed, in one example 2 + 12 only, joints nearly sessile.

Pupa-shell white, fuscous anteriorly. Larva bright orange.

Gall a deformed flower-head, about 10 mm. long, and 5 to 6 broad, covered by the greatly enlarged involucral bracts, which are smooth and vary from reddish to yellowish outwardly, but on the inner side are clothed with white hair. The flies emerge from between these bracts.

The *Artemisia* mealy-bug, *Erium lichtensioides* (Ckll.), proves to be extremely abundant at Colorado Springs.

Rhabdophaga Porteræ, n. sp.—*Gall.*—A slight irregular smooth swelling of a very small red willow-twig. The gall may be only about 2 mm. long, with a single cell, or 6 or 7 mm, with half a dozen or more larvæ; it is in all cases inconspicuous, like a small gouty swelling of the twig.

Pupa.—The pupa-shell is white, the thoracic parts not appreciably darkened, but there are two long reddish-brown cephalic spines, precisely as in *R. saliciperda*, Duf.

Imago.—Unfortunately, the only available flies are shrivelled and broken. They are similar to *R. saliciperda*, with the same produced ovipositor. Thorax rather dark gray-brown, scutellum prominent and pallid; abdomen yellowish brown; ovipositor clear light ferruginous. Legs pale brown. Venation about as in *R. saliciperda*. Length about 2 mm.

Hab.—Near Las Vegas, New Mexico, January 31. (Wilmatte Porter and Mary Cooper.) The gall is apparently nearest to *Cecidomyia salicis-hordeoides*, Walsh, among the American species.

Cecidomyia perosculta, n. sp.—*Gall.*—The insects form no true galls, but live in numbers under the bark of willow stems, the adults hatching about the middle of April.

Pupa.—Pupa-shell colourless; base of antennæ light brown; no cephalic spines.

Imago.—♂. Length about 3 mm. Black; scutellum dark red, abdomen faintly reddish; legs dark brown, tarsi more reddish; insect with abundant long dark hairs; sides of abdominal segments with large piliferous tubercles; thorax slightly shining, with two longitudinal velvety-black bands; knobs of halteres black or almost so; eyes united on vertex; forceps stout; antennæ moniliform, 2 + 18-jointed, with nearly globular stalked joints bearing single whorls of very long hairs; apical joint with a small terminal knob; wings ample, lower margin with a strong fringe; first vein terminating about middle of costa; no cross-vein between first and third; third distinct from the base, strong, bent downwards at end, but terminating before the most distal point of wing; median fold distinct; fifth vein colourless, forked near or rather beyond the middle.

Hab.—Colorado Springs, Colorado, April, 1904.

EARLY ARRIVAL OF AN ARCHIPPUS BUTTERFLY.—I was surprised to see on the 10th of May a worn specimen of *Anosia plexippus (Danais archippus)* flying about at the corner of Yonge and Bloor streets, Toronto. It alighted on the street close to my feet, and I could easily have secured it if I had had a net with me. The preceding three or four days were very warm, which may account for its coming north so early.—J. B. WILLIAMS.

SYNOPSIS OF BEES OF OREGON, WASHINGTON, BRITISH COLUMBIA AND VANCOUVER.—II.

H. L. VIERECK, ASSISTED BY T. D. A. COCKERELL, E. S. G. TITUS, J. C. CRAWFORD, JR., AND M. SWENK.

ANDRENIDÆ.

The species here treated belong to genera previously "lumped" under *Andrena*.

Three submarginal cells.

♀ with joint 3 of the antennæ shorter than 4 and 5; ♂ with joint 3 shorter than 5, rarely as long as 4; sculpture in both sexes with few exceptions coarse, enclosure usually ridged, depressions of abdominal segment usually sharply defined; ♀ with a simple tibial scopa ..... *Trachandrena.*

♀ with joint 3 as long as or longer than 4 and 5; ♂ with joint 3 longer than 4.

Tibial scopa of ♀ simple..... *Andrena* or *Opandrena.*

♂. Clypeus or face without yellow marks; joint 3 not longer than 4 and 5..... *Andrena.*

♂. Clypeus or face with yellow marks..... *Opandrena.*

Tibial scopa of ♀ plumose.

Tibial scopa thin, thinly plumose; ♂ without yellowish face marks; joint 3 longer than 4 and 5, cheek with a rounded angle ..... *Ptilandrena.*

Tibial scopa dense, densely pubescent; ♂ the same as ♂ *Opandrena* ..... *Pterandrena.*

Two submarginal cells in both sexes; ♂ with yellowish face marks..... *Parandrena.*

For details of the new species of Andrenidæ, see classification of North American species, which will appear in Transactions American Entomological Society, Phila.

TRACHANDRENA, Robt.

Females.

Second dorsal segment depressed about one-third..... *cratægi.*

Second dorsal segment depressed more than half, but not more than two-thirds ..... 1.

Second dorsal segment depressed two-thirds or more..... 8.

1. Abdomen *without* distinct whitish fasciæ ..... 2.

Abdomen *with* distinct whitish fasciæ at least laterally..... 5.

2. Anal fimbria pale ochreous.
   Dorsulum rugose, not distinctly punctured ..... *amphibola*.
   Dorsulum partly rugulose, but with distinct punctures.... *indotata*.
   Anal fimbria dusky dark brown or black.
   Sculpture of the elevated portion of abdominal segments dense, dullish ..... —
   Sculpture of raised portion of abdominal segments not dense, shining ..... —
3. Face and pleura with black hairs ..... *cupreotincta*.
   Face and pleura with ochreous hairs ..... *ochreopleura*.
4. Hairs on dorsulum thick ..... *crassihirta*.
   Hairs on dorsulum thin.
   Abdomen coarsely punctured, metathorax coarsely sculptured ..... *perdens*.
   Abdomen finely punctured, sculpture of metathorax not coarse .....
4½. Pubescence on dorsum brownish, first segment of abdomen shining, punctures well separated, as are the striæ of the area on metathorax ..... *hadra*.
   Pubescence on dorsum whitish, first segment of abdomen dull, punctures close together, as are the striæ of the area on metathorax ..... *limara*.
5. Anterior half of dorsulum with distinctly contiguous punctures, usually dull .....
   Anterior half of dorsulum with punctures separated; usually shining .....
6. Dorsulum shining; first segment closely punctured; lower half of frontal fovea broader than the adjoining shining space; tibiæ and tarsi of posterior legs, tarsi of anterior and middle legs pale honey colour or nearly ..... *hippotes*.
7. Anterior half of dorsulum dull.
   A sharp demarcation between enclosure and adjoining area at the sides; dorsulum rather dull ..... *salicifloris*.
   No sharp demarcation between enclosure and adjoining area at the sides; dorsulum rather shining ..... *salicifloris* var.
8. Distinctly separated punctures scarce or absent on dorsulum.
   Dorsulum rugose; abdomen blue ..... *cleodora*.
   Dorsulum not rugose; abdomen black ..... 9.
   Distinctly separated punctures numerous on dorsulum ..... 10.

9. Anal fimbria dark brown; wings dark; abdomen globose. *fuscicauda.*
Anal fimbria bright golden; wings pale.
Punctures on dorsulum numerous, close together; abdomen depressed ..... *auricauda.*
Punctures on dorsulum very sparse; abdomen more globose ..... *pernuda.*

10. Abdomen not densely punctured.
Pubescence white; stigma black ..... *semipunctata.*
Pubescence ochreous; stigma pale ..... *striatifrons.*

Males.

Second dorsal segment depressed about one-third, sixth ventral segment with reflexed angles ..... *crataegi.*
Second dorsal segment depressed more than one-third, but not as much as half .... 1.

1. Ridges of the area prominent, very coarse ..... 3.
Ridges of the area not prominent, rather smooth ..... 2.

2. Abdomen distinctly fasciate.
Dorsulum distinctly punctured; pubescence yellowish to bright fulvous ..... *salicifloris*, var. a.
Dorsulum indistinctly punctured; pubescence white ... *semipunctata.*
Abdomen indistinctly fasciate. ..... *salicifloris*, var. b.

3. Abdomen distinctly fasciate, enclosure large, with numerous striæ ..... *salicifloris.*
Enclosure small, with few striæ ..... *salicifloris*, var. c.
Abdomen indistinctly fasciate.
Distinct punctures numerous on anterior half of dorsulum... *indotata.*
Distinct punctures absent on anterior half of dorsulum..... *limarea.*

Trachandrena crataegi, Robt., Trans. Am. Ent. Soc. Phil., XX., p. 223.

Corvallis, Oregon, 6th May, 1899; 8th, 9th, 10th June, 1898 (Cordley). Washington.

Trachandrena amphibola, n. sp.

♀ 12 mm. Pubescence whitish, foveæ with brownish pubescence.

♂ about the same size, colour and general appearance of ♀, antennæ dull.

Type locality: Corvallis, Oregon; type Coll. Acad. Nat. Sci., Phila.*

*It is believed that the types will eventually go to this institution.

Corvallis, Or., 8th November (Cordley.) Washington.

Trachandrena indotata, n. sp.

♀ 11 mm. Pubescence short and white, not abundant, that in the foveæ also white; ♂ smaller, similar; antennæ dull.

Type locality: Corvallis, Oregon. Type Coll. Acad. Nat. Sci., Phila.

Corvallis, Or., 5th June, 1897; 8th, 20th, 25th May, 1898; 2nd June, 1899 (Cordley).

Trachandrena cupreotincta, Ckll., Can. Ent., XXXIII., p. 153.

Type locality: Skokomish River, Washington. Type U. S. Nat. Mus., Washington, D. C.

Skokomish River, Wash., 26th April, 1892 (T. Kincaid).

Trachandrena ochreopleura, n. sp.

Same size as the preceding, of which it may be only a variety.

Type locality: Skokomish River, Washington. Type U. S. Nat. Mus., Wash., D. C.

Skokomish River, Washington, 1st May, 1892 (T. Kincaid).

Trachandrena crassihirta, n. sp.

♀ 12 mm. The nearly black appearance of abdomen, the brownish pubescence in the foveæ, and, moreover, the short, thick, brown hair on dorsulum, make this a very distinct species.

Type locality: Washington? Type Univ. Nebr., Lincoln, Nebr.

One specimen presumably from Washington.

Trachandrena perdensa, n. sp.

♀ 11 mm. Pubescence of thorax and foveæ whitish.

Type locality: Victoria, British Columbia. Type Acad. Nat. Sci., Phila.

Victoria, B. C., 22nd July, 1902.

Trachandrena hadra, n. sp.

♀ 10 mm. Thorax and foveæ with pale yellowish pubescence; abdomen nearly entirely black; base of scopa black.

Type locality: Washington. Type Am. Ent. Soc., Phila.

Washington.

Trachandrena limarea, n. sp.

♀ 10 mm. Superficially like the preceding, but not so dark, pubescence more abundant.

Type locality: Corvallis, Oregon. Type Acad. Nat Sci., Phila.
Corvallis, Or., 10th June, 1896 (Cordley); Vancouver Is. (50).

Trachendrena hippotes, Robt., Trans. Am. Ent. Soc., Phila., XXII., p. 120.
Corvallis, Or., 1st June, 1896; 21st May, 1899 (Cordley); Washington.

This may be the same as *miranda*, Sm., but the ♂ described by Smith does not resemble the ♂ of *hippotes*.

Trachandrena salicifloris, Ckll., Proc. Acad. Nat. Sci., Phila., 1897, p. 351.
Olympia, Wash., 4th April, 9th May, at willow blossoms (T. Kincaid). Seattle, Wash., 21st April, 1895, on gooseberry (Lot 214). Corvallis, Or, 22nd April, 24th April, 30th May, 1898; 23rd, 24th May, 1899; 2nd, 3rd June, 1899 (Cordley). Livingston, Vancouver, 5th, 17th, 19th, 25th May, 1896. Wellington, B. C., 15th April, 1903 (Harvey).

Trachandrena cleodora, n. sp.
♀ about 11 mm. A very distinct species, being the only *Trachandrena* known with blue abdomen.
Type locality: Mt. Hood, Oregon. Type Am. Ent. Soc., Phila.
Mt. Hood, Oregon.

Trachandrena fuscicauda, n. sp.
♀ about 10 mm. Its dark colour, dense thoracic sculpture and pale foveæ make this a distinct species.
Type locality: Washington. Type Am. Ent. Soc., Phila.
Washington.

Trachandrena auricauda, n. sp.
♀ about 10 mm., sculptured much like the preceding, from which it can be at once separated by the golden anal fimbria.
Type locality: Washington. Type Am. Ent. Soc., Phila.
Washington.

Trachandrena pernuda, n. sp.
♀ about 10 mm. Superficially this resembles *salicifloris*.
Type locality: Pullman, Washington. Type Univ. of Nebraska.
Pullman, Washington (C. V. Piper).

Trachandrena semipunctata, Ckll., Ann. Mag. N. H., 9 (7), p. 102.
Seattle, Wash., 5th April, 1896 (T. Kincaid).

Trachandrena striatifrons, Ckll., Entom., 1897, p. 308.
Olympia, Wash., 19th April, 1894 (T. Kincaid); Victoria, B. C.

ANOTHER GEOMETRID COMBINATION.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

By a recent article in this Journal giving the life-history of *Sabulo*[illegible]*de* *arcasaria*, Walk., Dr. Otto Seifert [illegible] the need of careful stu[illegible]dy of some of our species of Geomet[illegible] case has come under n[illegible]my notice. In June, 1896, I ga[illegible]ating ten rough-looki[illegible]ng mahogany-red larvæ from a small [illegible] *(Quercus nigra)*. Th[illegible]ey were exactly alike in form and co[illegible] parently well-grown, so [illegible] I carried them home, supposing the[illegible]y ly mature. They had [illegible]no thought of it. Most of the time t[illegible] state of rigid extensi[illegible]on, at an angle from the twig they [illegible] eding only at night a[illegible]nd eating very little at one time. Abo[illegible] they began to spin lo[illegible]ng web filaments over the food-plant, and t[illegible] appeared under the lo[illegible]se leaves and chips on the surface of the earth in their box, where they sp[illegible]in very slight cocoons of webbing, sometimes none at all, and transformed to pupæ. These produced the imagoes from Sept. 2nd to 6th, four males a[illegible]nd four females. Of the latter, three have the large black spot on the in[illegible]er angle of the primaries, a characteristic marking of the species, and one is without it. I placed them in my collection, therefore, over the na[illegible]me *Metanema quercivoraria*, Guen. Recently I had occasion to study m[illegible]re carefully my Geometridæ, with the intention of arranging them in acco[illegible]rd with Dr. Hulst's revision and Dr. Dyar's "List." Much to my surprise, I found my males were excellent examples of *Metanema textrinaria*, G. & R., while the females were *quercivoraria*, Guen., as I had named them. The pattern of markings on the upper side of these two sexes of one species, as I am now compelled to regard them, is quite unlike, but on the under side the colour, lines and markings are similar, and it is curious this was not noticed before. Although *textrinaria* was described from a male specimen by Grote and Robinson (Ann. N. Y. Lyc. Nat. Hist., V[illegible] VIII., p. 449), it was omitted from Grote's "Check List" of 188[illegible], perhaps because he had detected this relationship, though I can find no proof in his writings to that effect. *Textrinaria*, G. & R., becomes, then, a synonym of *quercivoraria*, Guenée.

[The above communication was received before the publication [illegible]f Mr. Taylor's query in the May number respecting this species, but af[illegible]er the article was in type; the coincidence is interesting.—ED. C E.]

THE COCOON OF THE RAY SPIDER *(THERIDIOSOMA GEMMOSUM).*

BY THEO. H. SCHEFFER, MANHATTAN, KAN.

The Ray Spiders live a retired life along the banks of some creek, where overhanging bushes and projecting rocks afford the gloom which they seem to seek. In such locations, especially in the dark recesses under clusters of roots, we may look for their cocoons in mid-summer. They are among the most interesting to be found—little golden-brown balls, about one-eighth of an inch in diameter, suspended by a single glossy-white thread nearly an inch long. They are paper-like in texture and are attached to their stiff silken pedicels by a dilation of the latter in the form of a cone. At the time of hatching this little cone lifts up like a lid, adhering by merely a point of the circumference, and uncovers a small circular hole through which the young escape. The pedicel itself usually hangs suspended from two or three cross lines of silk attached to surrounding objects. (Fig. 6.)

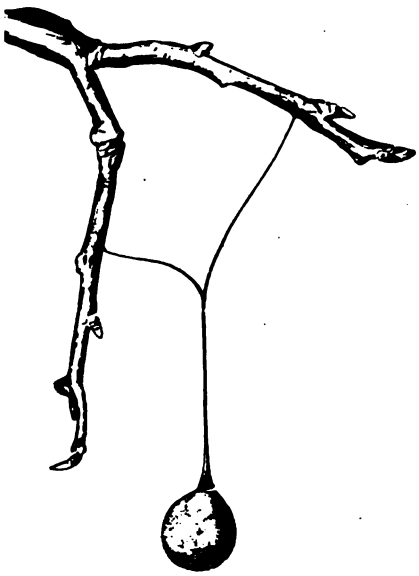

FIG. 6.

From some cocoons collected in the vicinity of Ithaca, N. Y., on August 23, the young spiders emerged August 28. Females imprisoned in glass tubes about the same time also spun cocoons.

ANNUAL MEETING OF THE MONTREAL BRANCH.

The 31st annual meeting of the Montreal Branch of the Entomological Society of Ontario was held on May 9th in the Library of the Natural History Society. All the reports of the officers showed good progress during the past year. The membership roll contains twenty-two names, two of whom are honorary members. The following officers were elected

for the coming year: A. E. Norris, president; A. F. Winn, vice-president; Geo. A. Moore, 24 Lorne avenue, secretary-treasurer; D. Brainerd, librarian and curator; H. H. Lyman, Charles Stevenson and Lachlan Gibb, council.

Mr. A. E. Norris read a paper, illustrated by lantern views prepared by himself, on Hydrœcias and several other Lepidoptera.

CHARLES STEVENSON.

APHODIUS ERRATICUS, LINN., ON MONTREAL ISLAND.

BY CHARLES STEVENSON, MONTREAL.

With the opening of the season, my son, Kenneth R. Stevenson, has proceeded to keep up his reputation as a Coleopterist by finding two specimens of *Aphodius erraticus*, Linn., on the first of May under stones on a waste piece of ground in Maplewood, near Montreal.

This beetle is widely distributed throughout Europe, and has been identified by comparison with a series of the species from France and Italy in the collection of Mr. G. Chagnon. I can find no previous record of its being taken in Canada among the lists I have had reference to. It was taken by the late Otto Lugger, near Baltimore, some years ago, and was described previously by Melsheimer under the name *pensvallensis*, from a specimen of which there are doubts as to whether it was a native or an accidental cabinet specimen. Dr. George H. Horn describes it in his monograph of the *Aphodiini* as inhabiting the United States (*Trans. Amer. Ent. Soc., XIV., Jan. 1887, p. 7*), and it is in Henshaw's List under No. 5514.

ACKNOWLEDGMENTS.

The Curator begs to acknowledge with grateful thanks the receipt of a box of Coleoptera from Mr. Norman Criddle, Aweme, Manitoba, containing over one hundred specimens, representing about fifty species; also from the same gentleman twelve specimens of Lepidoptera, including the following interesting species: *Chionobas Alberta*, *Hemileuca maia* var. *lucina*, *Dysocnemis borealis*, *Pseudotamila Avemensis*, *Leucobrephos Middendorfi* and *Apocheima Rachelæ*.

From the Rev. C. C. Waller, Principal of Huron College, London, Ont., specimens of the Carpenter Ant (*Camponotus Pennsylvanicus*) and portions of a Basswood tree showing its work.

NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, S. B., M. D., DECATUR, ILL.

In order to avoid needless repetition, I wish here to express my sincere thanks to Prof. John B. Smith and Dr. H. G. Dyar for numerous favours, and also to Mr. O. C. Poling for his great liberality in furnishing me with many of the species here described. Mr. Poling has made a number of collecting trips to little known parts of Arizona and Utah, and in addition to many new species has turned up many rare forms discovered years ago by Morrison and Doll. The fauna of Southern Arizona is essentially Mexican, and as there is at present no collection of Mexican Lepidoptera in this country worth mentioning, one in describing apparently new species from that region is certain to make synonyms. The probabilities are that within a few years one of the best if not the best Mexican collection in the world will be in Washington, then we shall have some foundation to build on, and will not have to waste time and burden our catalogue with a lot of names to be later relegated to the synonym list.

Syntomeida Hampsonii, n. sp.—Resembles *joda*, Druce, Biol. Centr. Am. Het., II., p. 333, pl. 71, f. 15 (1897); Hampson, Catalogue Lep. Phalænæ, Vol. I., p. 305. Head and thorax blue-black. Tegulæ and patagia orange-yellow, edged with black. Fore coxæ whitish on inside, yellowish outwardly, fore tibiæ yellowish inwardly, hind tarsi more or less whitish, palpi yellow, tipped with black, tongue yellow. Antennæ black, with more or less whitish towards tip. Abdomen black, with metallic blue scales on dorsum and sides, dorsal yellow spots on first, subdorsal on remaining segments. Anal tuft yellow above, black at sides and tip. Ventral valve yellow, edged with black. Abdomen beneath with yellow bands. Wings black, somewhat bluish metallic along costa, especially of males. A large orange-yellow spot in and below cell on fore wings and one midway between it and apex. Hind wings white or somewhat yellowish white at base, and a large orange-yellow spot beyond cell.

Types: several specimens collected by Mr. Poling in Southern Arizona. Aside from many minor differences, this species may readily be separated from *joda* by the presence of orange subdorsal yellow patches on all the abdominal segments, while in *joda* they are confined to the first, fourth and fifth.

Pygarctia Neomexicana, n. sp.—Expanse: ♂ 36 mm., ♀ 40 mm.

Female.—Palpi red, tipped with drab. Head drab in front, vertex red. Collar drab, patagia drab, bordered with red internally. Thorax drab in centre, bordered with red. Abdomen red, with dorsal and lateral rows of black spots. Beneath: thorax red, abdomen drab, legs drab, with the exception of fore femora, which are red within, tarsi more or less blackish. Antennæ dark brownish. Primaries stone drab, with a few red hairs just at base. Edge of costa whitish, fringe white, with dark line at base. Secondaries slightly darker shade of drab. Inner margin from base to inner angle red, about 2 mm. in width. Beneath as above. In the male the fore wings are of a rather light yellowish-fawn colour, darkened a little along the veins; hind wings are somewhat darker than the fore, otherwise the markings are the same as in the female. The male being somewhat rubbed and probably faded, the description is made from the female.

Types: 1 ♂, Alpine, Texas, June 28th; 1 ♀, Marfa, Texas, July 3rd.

Moma tybo, n. sp.—Expanse: ♂ 34 mm., ♀ 36 mm.

Colour bluish green, of about the same shade as *geminata*. Lines black, double but fragmentary, lighter filled. Basal half line represented by one or two dots on costa, and one or two on basal dash. T. a. irregular, broken, a dot on costa remaining, together with a heavy mark in middle of wing, prolonged as a well-marked basal dash to base, broadly exserted as a finer line below submedian vein to inner margin. The outer accompanying line is rather widely removed in centre of wing, but more closely approximated at costa and inner margin, quite faint and poorly defined. The median shade is represented by a double line, the inner well defined, the outer faint and fragmentary. The inner is heavy above and to outer side of orbicular, narrow and irregular though quite continuous the rest of its course. T. p. double, scalloped. The inner line faint, fragmentary, widely removed from outer, which is widely exserted around cell, then deeply incurved to inner margin. It is irregular, usually heavy below costa, opposite cell and at lower third reduced to a fine line or almost disappearing in other places. S. t. line much closer to t. p. line than to margin, emphasized by a more or less evident following paler shade. The space between it and t. p. more or less suffused with black, especially at inner margin. The line itself is

rather faint and irregularly scalloped. In terminal space opposite cell there is usually a quite distinct sagittate spot, in some specimens reaching even to t. p. line. There are usually one or two similar spots just above inner angle. Fringe white or greenish white at ends of veins, black between them, pale line at base. A marginal row of black lunules against the black spots of fringe. Orbicular moderate in size, round, concolorous, with whitish centre, almost completely black ringed. Reniform large, erect, kidney-shaped, concolorous, white centred. The black limiting line more or less incomplete and fragmentary. Hind wings rather dirty white, darker outwardly, distinct though not prominent, rather irregular mesial band. Discal dot present. Terminal more or less interrupted black line. Fringe pale, with tendency to formation of black spots as on fore wings.

Beneath: fore wings somewhat dusky, paler along inner margin. Three prominent black spots on costa, marking the inception of more or less distinct dusky transverse, rather diffuse bands; faint discal bar. Fringe as above. Secondaries somewhat paler, a black demi-band at basal third and a more complete outer one, both somewhat jagged and irregular. Discal dot, terminal line and fringe as above. Head dusky white. Collar, patagia and thorax green. Collar black on edge and extending mesially through it to head. Patagia edged with black internally at base. Thorax with some black scales posteriorly. Abdomen fuscous, showing tendency to be pale banded, fan-shaped tuft at base, green-black at tip. Palpi black outwardly, whitish within. Tongue yellow. Legs dirty white. Tarsi black ringed.

Types: Cochise Co., Ariz. Collected by Mr. Poling and myself.

Caradrina tacna, n. sp.—Expanse: 26–27 mm.

♂.—General colour a rather dark glistening golden brown, inclined to reddish in some specimens, slightly darkened along veins. There is a light frosting of white scales, which is emphasized around the ordinary spots and along the lines, bringing them out in a beautiful manner in fresh specimens on close inspection or under the lens, but it is so fine and delicate that but little remains in worn specimens. The subterminal space next to t. p. line is a trifle lighter than the rest of wing, and shades gradually into the concolorous terminal space. Head, collar and thorax concolorous, the edge of collar with more white scales than the remainder. Abdomen fuscous. Inception of ordinary lines marked by faint white dots on costa.

Basal half line only traceable on most perfect specimens. T. a. transverse, quite regularly scalloped. T. p. waved, almost transverse opposite cell, then making a slight inward angle, with a slight inward curve to inner margin. S. t. line quite irregular. Terminal line quite straight, very slightly scalloped between veins. Fringe brown, paler at base, edge and opposite veins. Orbicular prostrate, oblong or pear-shaped, with outward projecting point, in some specimens fusing with corresponding projection from reniform, which is large, erect, slightly constricted, with lower portion swollen and with sharp inward projection at lower edge. Hind wings pale dirty white, fuscous towards margins, very faint trace of discal dot and pale mesial band. Beneath pale brown, suffused with gray along costa and outer margin, evidences of pale mesial band, more marked towards costa. A few pale points along costa as on upper surface. Hind wings as above, only darker, along costa and mesial band a trifle more pronounced.

♀ similar to ♂, except the hind wings are darker throughout and the discal dot and mesial band better defined.

Types: Kerrville, Texas; Shovel Mt., Texas. Collected by Mr. Lacey and Mr. Schaupp.

Hadena Kyune, n. sp.—Expanse: 34 mm.

Head, collar and thorax very dark gray, almost black. Under the lens the collar shows a median jet black band and also a slightly darker shade along the margin, extreme edge being, however, somewhat lighter gray. The collar is slightly bilobed. Palpi rusty brownish. Eyes naked. Fore wings to s. t. line dark purplish brown, beyond s. t. line of a rusty light yellowish brown, forming a sharp contrast with the rest of the wing. Lines and ordinary spots marked in jet black. Basal half line distinct, though not prominent. T. a. line outwardly oblique, somewhat irregular, thickened at either end and in the middle. T. p. line single, black, distinct, widely and broadly exserted over cell, thence parallel to outer margin in a quite direct course to inner margin, followed by a narrow, slightly paler shade. The line itself is lunular, the individual lunules are considerably thickened in the middle, and two of those opposite cell project inwardly as two black dashes as far as reniform. S. t. line widely removed from margin, black, somewhat irregular, closely following course of t. p. line from inner margin to opposite cell, so that it has the appearance of a double line. In the centre of the wing the line

is thickened opposite to and projecting into the lunules of the t. p. line. Terminal space light yellowish brown, very even in colour. Black lunular lines at base of fringes, which are defective in the specimen before me, but appear to be concolorous with terminal space. Hind wings fuscous, somewhat darker externally to an obscure mesial line. Discal dot present, though not pronounced. Abdomen yellowish fuscous. Beneath yellowish fuscous, with the common median band and discal dots not prominent on hind wing. Legs, thorax and abdomen somewhat darker fuscous.

Type: 1 ♀, Huachuca Mts., Ariz.

Oncocnemis Polingii, n. sp.—Expanse: 28 mm.

Head, collar and primaries from base to t. p. line, as well as the terminal space, of a light brown colour. Thorax, orbicular and subterminal space lighter in colour, contrasting, the first two being of a yellowish-white or gray colour, while the last, showing less of the yellow tinge, is of a more bluish-gray colour. The head and palpi are of the same general buff ground colour, with an admixture of black and white. There are two black bands across the head between antennæ, and three across the collar, which is tipped with whitish. The thorax and patagia are clothed with a mixture of buff, black and white hairs and scales, the white predominating so as to give a yellowish-gray effect as a whole. There is a quite well marked posterior thoracic tuft. Abdomen of a quite uniform buff colour; along the dorsum, especially of the basal segments, a few black hairs can be seen grouped together, and at the base of the anal tufts they form a transverse band, which is quite distinct under a lens. Thorax and abdomen beneath a shade lighter than above, the former thickly coated with hair. Legs checkered buff and black. Anterior tibiæ with stout spur. Primaries above with the ordinary lines and spots distinctly and neatly marked. Basal half line single, black and well defined, joined at lower end by spur from t. a. line along median vein. The t. a. line is somewhat thickened at its origin, which is almost directly above the inner edge of the orbicular; from this point its course is downward and inward to the median vein, thence downward and outward, making two outwardly convex scallops before reaching inner margin. The line is black, distinct and neatly defined; it is accompanied on its inner side by a brownish line, more diffuse and not so neatly defined. The accompanying line follows the spur connecting the basal and t. a. lines on both upper and lower sides. On the upper side it joins a similar line on the outer side of

the basal line, which is then continued across along costa to t. a. line again, thus forming a brownish ring in the superior enclosed part of basal space ; the centre of the ring shows as a spot somewhat lighter in shade than the general ground colour. The inferior part of the basal space is also somewhat lighter than the ground colour. With the lens a few black scales can be seen as an extension of the connecting line to the base, but not enough in the specimen before me to be called a basal dash. The median shade is black, heavier, and more prominent than the other lines, especially at the costal end. It runs from the costa downward and outwards along inner border of reniform to its lower border, where it meets the t. p. line and accompanies it to inner margin. The t. p. line is thickened at its origin on costa, is exserted over cell, touches lower border of reniform, thence by three inward scallops between veins to inner margin ; the upper portion of line is only slightly scalloped. The t. a. line is nearer the base of the wing in this species than in *occata*, so that there is a wider space between it and the t. p. line on inner margin, and the median shade does not tend to diffuse itself over this space as in *occata*, but clings to the t. p. line as a well-defined band, only covering from one-third to one-half the space. To the outer side of the t. p. line is an accompanying brown shade line, which is more pronounced on costa. The s. t. line is pale, and indicated chiefly by the contrast between the terminal and subterminal spaces. It is irregular and not well defined. The veins from the t. p. line outward are more or less coated with black scales, and the spaces between them in the subterminal space are somewhat dusted with brown scales, which in the lower three or four spaces show a tendency to arrange themselves into rather poorly-defined arrow heads, with the points in. *Occata* shows neat black dashes in those spaces. There is a neat, even, black line at base of fringes which seems to be concolorous with terminal space and not checkered as in *occata*, but in the specimen before me they are quite worn away, so that it is impossible to give an accurate description of them. The orbicular is strikingly different from that in *occata* ; it is almost or quite as large as the reniform, oval, with long axis longitudinal, neatly outlined by a fine black line and of a bluish-gray colour, contrasting with the brown of the median space. Closely within the black ring there is a narrow brown ring. The reniform is upright, oval, concolorous and outlined by a fine black line which is a little irregular in its course, it is a little darker to the inner side seemingly due to the median shade encroaching on it. The claviform

large, touching orbicular above, finely outlined in black to the inner side and centrally concolorous, somewhat paler along upper, outer and lower sides from an admixture of paler scales. Secondaries pale yellowish, veins darker, faint discal dot, mesial line distinct, but fine, and not conspicuous, outer border of wing almost but not quite to mesial line, black. Fringe brown at base, white outwardly. Under surface pale yellowish from base to mesial line, external to this, blackish. A black blotch on middle of costa of both wings. Faint discal dot on secondaries. Mesial line on primaries, distinct on upper half, fading out as it reaches inner margin, on secondaries distinct through its entire course and emphasized by black dots on the veins.

Type: 2 ♂'s from Southern Arizona. One from Mr. Poling and one of my own collecting.

While recalling *occata* to a striking degree, it does not require any very close inspection to readily separate them.

Rhizagrotis socorro, n. sp.—Expanse: 36 mm.

Ground colour varying from a pale yellowish brown, in some specimens, through a quite well-marked luteous or reddish brown in others, to a quite dark blackish brown form. Black shades and pale yellowish or luteous markings encroach so much on the ground colour, however, as to give a quite mottled effect. Aside from the ordinary lines and spots there is a prominent black shade through cell from just before orbicular to t. p. line, more pronounced in the darker specimens, more contrasting in the paler. A broad, heavy basal dash extends to t. a. line, and after being interrupted by it, is continued on as the prominent solid black claviform from a quarter to half across the median space. There is also a blackish shade on costa just before subterminal line, and one on outer margin opposite cell beyond it. The costa is broadly pale creamy or luteous yellow to t. p. line, with five or six dark spots on its edge, marking inception of transverse lines. In some specimens these spots are more or less fused, thus encroaching somewhat on the pale border. Ordinary lines double, black, pale-filled. The basal half line not present, except the dots on costal edge. T. a. moderately outwardly oblique, only marked on costa and below cell, slightly scalloped, outer line more prominent. T. p. moderately exserted over cell, thence with only slight curve quite obliquely to inner margin, about 2 mm. from t. a. line, well scalloped, inner line well marked, outer faint. S. t. line bluish white,

beginning with a quite well-marked apical patch of the same colour, q[illegible]uite irregular, projecting inwardly opposite cell and again in lower th[illegible]ird, traces of black dashes preceding it in some specimens. Orbicular sm[illegible]all, round, black outlined, complete or open above, concolorous with co[illegible]sta, usually darkened centrally. Reniform about normal shape and size, p[illegible]ale creamy yellow, luteous centred, outlined in black. Claviform solid bla[illegible]ck, moderate in size. Black terminal line, emphasized between veins i[illegible]nto lunules, which show a tendency in some specimens to extend across the terminal space. Fringe luteous at base, darker centrally, whitish at e[illegible]dge. Secondaries subpellucid, white, slightly dusky at apex and along ve[illegible]ins. Fringe white, dusky line at base. In ♀, smoky with faint discal [illegible]dot. Beneath fore wings more or less smoky, paler along inner margin. Di[illegible]scal dot, though not prominent. Mesial band distinct on costa, fading out before inner margin. Pale area at apex preceded by dark patch at inception of outer shade. Hind wings whitish, some dark scales al[illegible]ong costa, small discal dot. Mesial band evident on costa and continued by a few dusky dots a short distance across wing. In ♀, the wings beneath are darker and the bands more prominent. Head, collar, thorax and abdomen concolorous with ground colour. Collar with mesial black band. Patagia inwardly edged with black at basal half. Posterior edge of abdominal segments paler in some specimens, especially the females, giving a banded appearance. Palpi blackish externally, luteous at tip and internally. Thorax and abdomen grayish white beneath, more or less tinged with luteous. Anal tufts luteous. Legs gray, tarsi banded blac[illegible]k and luteous.

Types: Huachuca Mts., Ariz.

Rhizagrotis salina, n. sp.—♂. Expanse: 32 mm.

Fore wings warm blackish brown, with a faint reddish tinge. Cost[illegible]a broadly luteous yellow to outer edge of reniform, darker along extreme[illegible]ae edge. Distinct black basal dash to t. a. line. A black dash from before[illegible]e orbicular through cell to t. p. line. Basal line obsolete. T. a. line[illegible]e double, obsolete above, scalloped between veins below median, outer[illegible]r portion black, quite distinct, inner faint, luteous yellow filling. T. p. line[illegible]e evident beyond cell, but not prominent, pale, confining lines scarcely[illegible] discernible. The remainder of line to inner margin scarcely traceable,[illegible] except in certain lights. S. t. line not evident. A triangular portion of[illegible] subterminal space below costa somewhat darker than ground colour. The[illegible]

minal space, especially opposite cell, is also more or less irregularly

darkened. Fringe fuscous, paler at base and preceded by black marks between veins, those opposite cell being more prominent and almost or quite reaching t. p. line. Orbicular a minute round yellowish dot. Reniform quite broadly oval, upright, yellow narrowly outlined in black and including a central ochraceous annulus. Three or four pale points on costa towards apex. Claviform short, well marked, outlined in black. Hind wings white, very slightly darkened along costa and at apex. Fringe white, with faint dusky line at base. Beneath fore wing smoky, somewhat paler along costa, discal dot, extra mesial band and short bar from costa, close to apex, well marked but not prominent. Hind wings with faint discal dot and mesial line, the latter traceable only a short distance from costa. Costa somewhat darkened, the rest of wing white. Palpi brown, terminal joint ochraceous. Head and collar mixture of gray and ochraceous, the former with two black spots between antennæ, the latter with mesial black transverse band. Patagia ochraceous, strongly black margined within, thorax pale gray, abdomen pale brown.

Type: 1 ♂, Huachuca Mts., Ariz.

(To be continued.)

NOTES ON GENERIC CHARACTERS IN THE LYCOSIDÆ.

BY RALPH V. CHAMBERLIN, ITHACA, N. Y.

(Continued from page 148.)

In *Lycosa* there is in most cases present a small, apically more or less rounded flap or lobe at and pressing against the base or origin of the embolus. This lobe, which may be spoken of as the *palea*, is often small or but weakly developed; but in *L. pulchra* it is very long and conspicuous. Here it embraces and supports the embolus along much of its length, being at the same time shifted ectad from its usual position. This special development of the supporting palea in *L. pulchra* is associated with the peculiar position of the embolus, which, instead of curving back to rest along the lectus in the usual manner, here arches forward and outward (i. e., ventrad) free from the bulb, only its apical part, which turns forward and rests obliquely across the auricula, being at all in contact with the lectus. The unusual size of the palea is evidently necessitated by the otherwise unsupported condition of the proximal portion of the embolus.

Above and ectad of the origin of the embolus is a variously complicated lobe, which was first unhappily termed the *spermaphorum* by Menge, under the false impression that its function was that of a sperm

reservoir. It has been better called the *conductor emboli*. The conductor usually presents an elevated rim or edge along its length dividing two commonly depressed areas or furrows, the upper one frequently raised along its length or sometimes transversely into a series of parallel ridges. Upon the upper edge of the lower furrow, opposite which is normally during quiescence the embolus, is borne a variously-formed, but mostly needle- or blade-like, strongly chitinized process or apophysis, which may be termed the *tenaculum*. There may be a second or third similar but smaller *accessory* tenaculum. Other features of the conductor need not be mentioned here.

The large, strongly-arched basal division of the bulb, covering over most of the hæmatodocha, is protected by a number of variously-formed chitinous plates, which, together with other hard parts at the surface of the palpal organ, were collectively termed the tegulum by Wagner. The largest of these plates and the one covering over much of the lobe is the *basal plate*. Proximad from this and sometimes concealed by its protrusion backward, is a smaller plate covering over and protecting the *fundus* of the semeniferous tube, the walls of the latter structure not being themselves chitinized at and towards its enlarged end. This plate may be spoken of as the *lunate plate*. It is usually in connection with a more slender rod-like plate, which is joined by one end to the wall of the alveolus, and which may be spoken of as the *petiolar rod* or *petiole*.

Toward the middle or more often the anterior end of the basal division of the bulb and either at the middle or toward the exterior side is borne a conspicuous and often large, highly chitinized apophysis, which is in large part plate- or blade-like, in form being thinner more or less dorso-ventrally. The different position and structure of this apophysis, which will be called the *scopus*, serve very readily to distinguish the genera now under consideration, the differences being clear and well-marked. About the base of the scopus in *Pardosa* and *Lycosa* is elevated a fold of varying height, forming thus what may be spoken of as the scopal pit. In some *Lycosidæ* there is no trace of such a fold.

In *Pardosa* the scopus occupies, without exception, a median position, for the most part some distance back of the front margin of the lobe. It is free for the greater part of its length, being attached only at its base. The scopus bears a process or spur, which is always basal in position, and which may be in part or as a whole concealed by the basal fold. The basal fold in *Pardosa*, however, is comparatively low, covering but little

f the basal part of the scopus. The basal spur is relatively short, in most ıore or less uncate distally, and extending out nearly at right angles to ıe scopus. The scopus may be short and stout, relatively wide, as *P. ıpidicina*, *brunnea* and *Californica*; in other cases it may be long, ; in *P. Emertoni* and *Banksi*.* In *P. sternalis* and *P. minima*, etc., the :opus curves freely forward and outward to or beyond the outer margin f the alveolus, and is of nearly the same width throughout its length.

In *Lycosa* the scopus is transverse and essentially exterior in position. : is free only apically. Toward its base, *i. e.*, mesally, it flattens ıt in plate-like form, and is usually covered over by the extended basal ld. It lies immediately back of the lectus. Below its apex it is always rovided with a more or less retrorsely directed and variously pointed rocess, "spur" or barb, which is often conspicuously salient. The ɔical process itself may also be salient, or in other cases it may not rise ɔove the side of the alveolus. In some species the scopus is comparavely small, and almost concealed at the side of the bulb both in side and :ntral views.

In *Pirata* the scopus is borne in a median position, but distinctly rther forward than in *Pardosa*, being attached by its base to the front ce of the basal lobe, and projecting freely forward to or beyond the front argin of the alveolus. The scopus is broad from side to side. The base the scopus is always extended transversely on the exterior side into a ell-developed branch, which in most has the front angle at its free end oduced anteriorly in varying degrees. The basal portion of the scopus thus very broad; and it nearly always completely conceals the comratively small embolus from sight. The principal branch of the scopus typically very wide proximad, narrowing gradually distad, and running ɔre or less to a point, the branch distally curving in some degree tward; i. e., in the same direction as the basal process (Cf. *'acondana*, *insularis*, etc.). A process or spur may be borne ɔn the main branch above its lower part, either at the outer le or upon the inner (i. e., dorsal) face. There is such a spur the latter position, for example, in *P. insularis*, which may be detected ly when the palpus is viewed obliquely or from the side. The scopus less deeply chitinized than in *Pardosa* and *Lycosa*. The conductor is it little developed.

*New names for *pallida*, Em., and *littoralis*, Bks., respectively, which are preıupied.

Seemingly associated with the apical position of the scopus in *Pira*[illegible]a is a drawing forward of parts at the base of the bulb. The lunate area [illegible]s large and conspicuous, being one-third or more as long as the entire bulb[illegible]; whereas in *Lycosa* and *Pardosa* it is evidently smaller. In *Schizoco*[illegible]a (new) it is very small and of a characteristic form.

Of course there is a considerable number of structures in th[illegible]e copulatory organs other than those which have been briefly treated her[illegible], which furnish characters available for systematic work. The conduct[illegible]r emboli, for example, in its general form and in the structure of its furrow[illegible]s, and especially in the form and disposition of the tenacula, affor[illegible]ls characters by which alone, at least the commoner genera may [illegible]e separated by one who has sufficiently acquainted oneself with them.

In conclusion, it may be well to give brief diagnoses of the thr[illegible]e genera that have been more particularly discussed in the preceding pag[illegible]s, and also of *Schizocosa*, new. The last named genus is erected for a gro[illegible]p of species, including *ocreata*, Hentz, and its allies, some of which ha[illegible]e been placed in *Lycosa*, others in *Pardosa*, or the same one in both [illegible]y different workers. Other species of the genus are *venustula*, Her[illegible]z, (= *Pardosa gracilis*, Bks., and *Lycosa relucens* and *verisimilis*, Mont[illegible]—), *bilineata*, Em. (= *Pardosa bilineata*, Em., and *Lycosa ocreata pulch*[illegible]a, Montg.), and *humuli*, Bks. For the sake of brevity, only charact[illegible]rs drawn from the copulatory organs are given below without indicating ot[illegible]her important characters in correlation.

PARDOSA, C. Koch.

Epigynum with a distinct guide, which is but weakly or not at [illegible]all developed anteriorly, its transverse arms entire; openings of [illegible]the spermatheca protected, leading on each side into a relatively large [illegible]and depressed fovea or basin, the lateral furrows becoming narrower [illegible]and shallower anteriorly. Pars basalis of bulb of male palpus bearing [illegible]a scopus in a median position and evidently proximal from the front [illegible]edge of the lobe; scopus attached only at base, toward which it bears a [illegible]short spur, when elongate, comparatively slender, not much widening proximad; a true lectus but rarely present, when so, never produced into an auricle; extreme lower or posterior margin of inferior furrows of conductor bearing a variously formed but usually stout and often lobed or dentate tenaculum.

LYCOSA, Latr.

Epigynum with a strongly-developed guide, the septal piece distinct and well developed anteriorly; openings of the spermatheca protected

lateral furrows widest anteriorly, where they are also comparatively deep, narrowed posteriorly by the inward protrusion of the side walls, the channels leading to the spermatheca being thus much contracted; transverse arms of guide not divided. Scopus borne at exterior side of bulb; transverse in position and attached along front side well distad, bearing a subapical more or less retrorse process or barb; median margin of furrow of conductor bearing one or sometimes two slender needle- or blade-like and always simple tenacula. Lectus well developed, with a distinct auricula of moderate size.

SCHIZOCOSA, n. gen.

Epigynum with a distinct guide, which is elevate and well developed anteriorly as in *Lycosa;* transverse arms of guide double (i. e., divided from their exterior ends mesad a varying distance); lateral furrows not widening anteriorly, the sides straight or nearly so and subparallel. Bulb of male palpus bearing a scopus transverse and exterior in position with a subapical process or barb; superior furrow of conductor ill-defined, showing no rugæ. Conductor elevated at its exterior end anteriorly and more or less produced into a horn-like process of varying length; median rim bearing more or less ectad of its middle a basally broad and apically-pointed, relatively short, piate-like tenaculum, which is curved backward and dorsad distally, a shorter similarly stout secondary tenaculum ectad and cephalad from the first. Auricula of lectus very long, extending forward along the side of the conductor and attaining, or nearly attaining, the front margin of the alveolus. Embolus distinctly angled or elbowed at base of auricula. Lunate area very small.

PIRATA, Sund.

Epigynum possessing no true guide, in most cases presenting behind two more strongly-chitinized lobes or tubercles upon which the spermatheca open free. Bulb of male palpus bearing a scopus in a median and subapical position; its base attached on front face of basal lobe of bulb; its principal branch reaching to or in most extending beyond the front margin of the alveolus; a basal process of large size. Embolus small, nearly or quite concealed by proximal part of scopus. Lunate area large, fully one-third or more the total length of the bulb.

ERRATA IN PREVIOUS PART.

P. 145, line 14 from top, for *generic* read *genetic.*

P. 146, line 14 from bottom, for *fourtionellement* read *fonctionellement.*

P. 147, line 10 from top, for *embrolus* read *embolus;* line 18 from

top, for *Schizogyna* read *Schizocosa;* line 11 from bottom, for *leaving* read *having*, and insert the clause, *but . . . . anteriorly*, within the parenthesis after *littoralis*.

P. 148, lines 14, 24 and 35 from top, for *Priata* read *Pirata;* line 15 from top, for *Anocosa* read *Allocosa;* line 27 from top, insert between *probably* and *insularis*, Em., the words *related to;* line 14 from bottom, for *semiferous* read *semeniferous;* line 19 from bottom and in foot-note, for *Tullgreu* read *Tullgren;* in the foot-note, for *Lounberg* and *Akad*, respectively, read *Lönnberg* and *Akad*.

BOOK NOTICE.

THE HARRIMAN ALASKA EXPEDITION, VOLS. VIII. AND IX.—Insects, Part 1, pp. ix + 238, 17 plates; Part 2, pp. 284, 4 plates; numerous headpieces and figures in the text. Published by Doubleday, Page & Company, New York.

These two sumptuous volumes contain the entomological results of the far-famed Harriman Expedition to Alaska in the summer of 1899. The voyage was undertaken by the generous leader of the enterprise, as a journey for recreation and enjoyment, but its far-reaching importance was established by the invitation of twenty-three literary and scientific men to accompany the party. The results are now being made known to the world by the publication of a series of splendid volumes, beautifully printed and bound, and fully illustrated with admirable plates and a variety of artistic engravings.

The entomologist of the party was Professor Trevor Kincaid, of the University of Washington at Seattle. How zealously and successfully he worked may be gathered from the fact that during the two months devoted to the Expedition, a large portion of which was necessarily spent on board ship in travelling from place to place, he collected about 8,000 specimens, including 5,500 pinned insects and a variety of Arachnida, Myriapoda and larval forms. On his return home, these collections were carefully gone over and then sent to Dr. L. O. Howard, United States Entomologist, for distribution to specialists for study and report. The results are now given in these two volumes, and form eighteen papers by twelve well-known entomological authorities. Prof. Kincaid himself furnishes a very interesting introduction, in which he describes the localities visited, and the flora and insect fauna that came under his observation, and also papers on

the Metamorphoses of Alaska Coleoptera, the Tenthredinoidea, and the few Sphegoidea and Vespoidea obtained. Mr. Nathan Banks describes the Arachnida and Neuropteroid Insects; Mr. O. F. Cook, the Myriapoda; Mr. Justus Watson Folsom, the Apterygota; Mr. A. N. Caudell, the Orthoptera; Mr. Theo. Pergande, the Aphididæ and Formicidæ; Dr. Wm. H. Ashmead, the Homoptera and Hymenoptera; Mr. O. Heidemann, the Heteroptera; Mr. Rolla P. Currie, the Odonata; Mr. E. A Schwarz, the Coleoptera; Dr. H. G. Dyar, the Lepidoptera; and Mr. D. W. Coquillett, the Diptera. Each writer gives a list, with dates and localities, of the species assigned to him and describes the new forms. Altogether the entire collection consisted of 1,001 species, of which no less than 344 were considered to be new to science, and are accordingly named and described in these volumes.

It is evident from the foregoing summary that a very important addition has been made to the knowledge of the insects of the far north-western regions of North America, regarding which nothing has been known, except in the order Coleoptera, which received much attention from early Russian investigators and was more recently catalogued by the late Dr. John Hamilton. It will now be comparatively easy for travellers in the future to collect and identify the insects found in Alaska, and our friends in British Columbia will obtain in these volumes a large amount of valuable information regarding the forms inhabiting that portion of our country. To them, indeed, this work will be indispensable, and it should find a place in all the public libraries of the Province.

JOCULAR ENTOMOLOGY.

The remarks of Prof. Aldrich on the above subject in the March number of the CANADIAN ENTOMOLOGIST suggest to me the existence of a good deal more humour, intentional or otherwise, in scientific (?) nomenclature than appears on the surface. It must sometimes be very difficult, if not impossible, for an author to choose a name, especially one not preoccupied, having some reference to specific characters, habitat, or *modus vivendi*, and it is quite obvious that thousands of names in existence were never intended to have any such reference whatsoever. The custom of naming things after people, whether they lived many years B. C. or in more modern times, or after classical myths, might become intolerable if carried too far, and it seems as if a little humour, which is often the fresher for being unconsciously suggested, is bound to creep in

somewhere. And why not? It is surely an improvement on so much of the dog-latin, or what may just as well be termed cat-greek (not to mention the false concords !), with which scientific lists are crowded. It is hard enough at times for one who, like myself, has no pretensions as a classical scholar, to make so much as a vague guess at the translation of names that are grammatically correct, without trying to discover their application too. To hear the pronunciations often given to names must have made many a schoolmaster squirm. And why do not describers more often state their reason for a name when that is not self-evident?

I was the other day arranging in series, previous to examination, a species I had received by mail. There were 5 or 6 specimens, and they had but one antenna each, some the right and some the left. As I looked at them I wondered whether such an accident had ever given birth to the name *alternata*. Can it have been the condition of the type specimen to which the name *Leucania imperfecta* was intended to refer? Or did successfully-replaced wings, antennæ, etc., give rise to the application of *refecta* to an *Oncocnemis*? Alas! there must be many a type to which *trita* would be much better suited than the name it bears, and Sir George Hampson, who has the care of the types at present, can perhaps tell us whether Morrison's *Agrotis intrita* does not require redescription, say, as it has travelled far, as *fracta*. I cannot find that a description of *dirupta* has ever been published. The mail clerks send me lots. It seems to have a very wide range, and is referable to a large number of genera. One might be excused for wondering whether when Walker described *Dryobota illocata* he was doubtful as to its affinities. Such apparently was really the case with Prof. Smith sixteen years after Grote had redescribed the species. But reference to Prof. Smith's Catalogue shows that lack of a locality label on the specimen evidently suggested Walker's name. Would that all collectors would endeavour to obviate this application of the name again. "Retained" is often the final comment made—and, I must admit, generally in full justice—by specialists to collectors on new forms sent for naming. Yet, strange to say, *retenta* is not yet in use in the N. American Lepidoptera. There is, however, a *Xylopharia remissa*, which in this sense may or may not have been misapplied. These suggestions might doubtless be carried very much further.—F. H. WOLLEY DOD, Millarville, Alberta.

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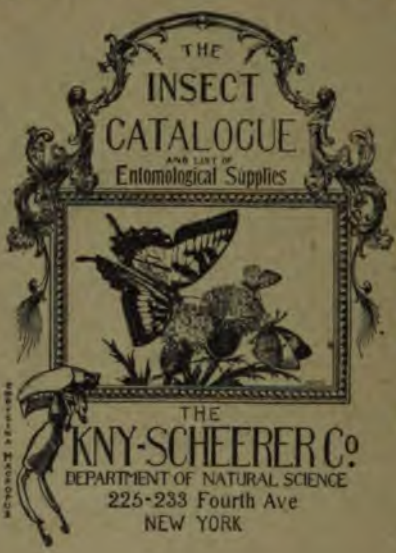

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The Canadian Entomologist

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REV. C. J. S. BETHUNE,

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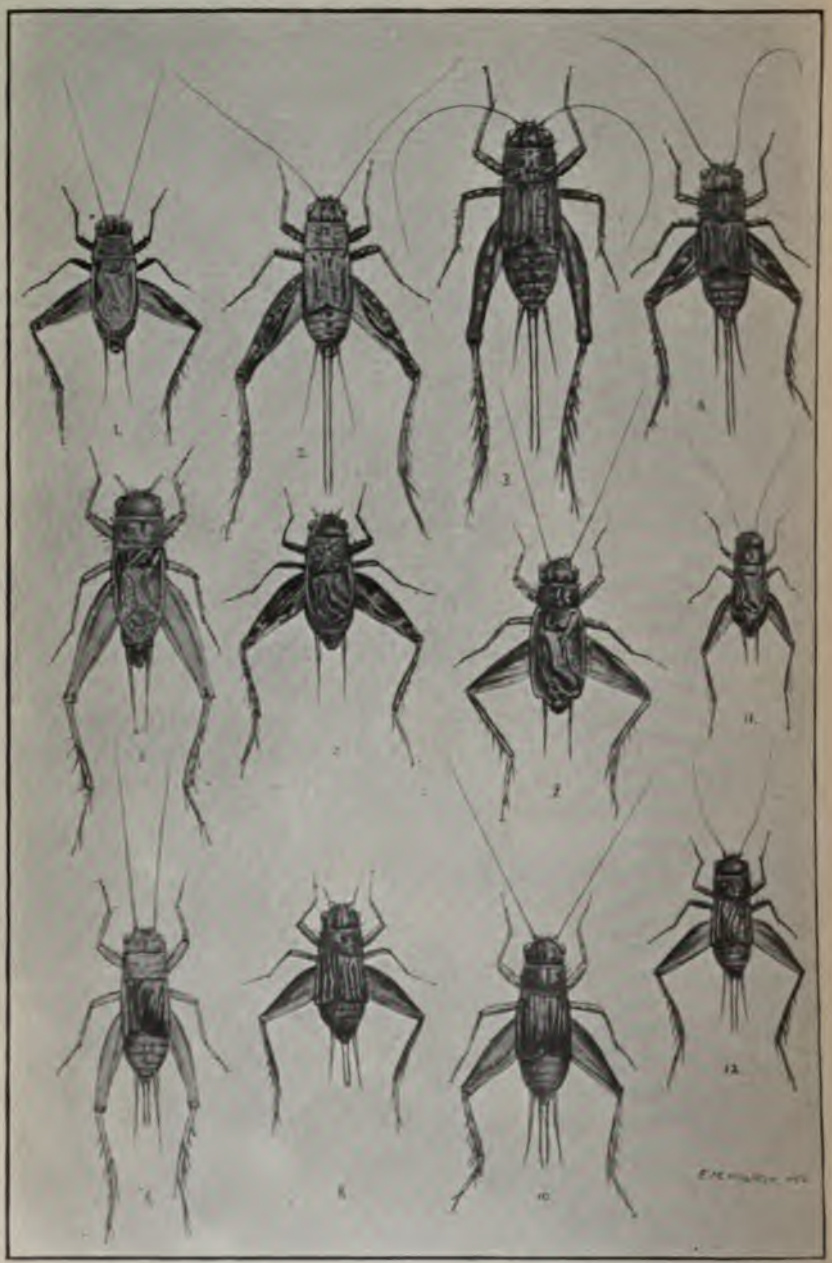

THE CRICKETS OF ONTARIO.

The Canadian Entomologist.

VOL. XXXVI. LONDON, JULY, 1904. No. 7

THE CRICKETS OF ONTARIO.

BY E. M. WALKER, B. A., M. B., TORONTO.

(Continued from page 144.)

Subfamily GRYLLINÆ.

This subfamily includes the common field and ground crickets, and is represented in Ontario by two genera, *Nemobius* and *Gryllus*. These may be separated as follows:

a. Small species; last joint of maxillary palpi twice as long as the one preceding; hind tibiæ furnished with long movable spines; first joint of hind tarsi unarmed above, or with one row of small teeth ..... *Nemobius.*

aa. Medium-sized or large species; last joint of maxillary palpi but little, if any, longer than the one preceding; hind tibiæ armed with short immovable spines: first joint of hind tarsi sulcate above, with a row of teeth on each side ..... *Gryllus.*

Genus NEMOBIUS.

This genus is best known by the common little striped ground cricket *(N. fasciatus)*, which abounds in our fields and roadsides in late summer and autumn. Our other species are all much more local and less numerous in individuals, and are not likely to be taken by the collector unless he is specially looking for them.

Key to Ontario species of Nemobius.

a. Ovipositor as long as or barely shorter than the hind femora, straight or nearly so.

b. Ovipositor distinctly longer than hind femora, black of body arranged in lengthwise bars.

c. Ovipositor a fourth longer than hind femora, colour light grayish, with distinct black markings; size medium or rather small ..... 1. *N. griseus*, n. sp.

cc. Ovipositor not more than about an eighth longer than hind femora, size large.

d. Colour blackish or fuscous; the dark stripes on occiput always visible, though sometimes indistinct in very dark specimens ....2. *N. fasciatus*.

dd. Colour light reddish-brown or grayish; without dark stripes on occiput .....3. *N. canus*.

bb. Ovipositor no longer than hind femora; black of body scattered in blotches and dashes .....4. *N. maculatus*.

aa. Ovipositor distinctly shorter than hind femora, usually more or less arcuate.

e. Small species; tegmina of male covering about three-fourths of the abdomen, last two joints of maxillary palpi in female dark brown .....5. *N. palustris*.

ee. Medium-sized species; tegmina of males reaching tip of abdomen, last two joints of maxillary palpi in female light brown .....6. *N. angusticollis*, n. sp.

3. NEMOBIUS GRISEUS, new species.

Size rather small, body moderately slender, light yellowish gray, covered with fine short closely-appressed gray hairs. Head about as wide as the pronotum, rather large, full and rounded; below the antennæ deep shining piceous, elsewhere yellowish gray, the occiput with three distinct dark gray longitudinal bands. Eyes of average size, about as prominent as in *N. fasciatus*, but rounder than in that species. Maxillary palpi dark reddish-brown, the third joint and the apex and base, respectively, of the second and fourth lighter. A dark piceous band starts behind the eye and covers the lateral lobe of the pronotum, except the extreme lower margin, which is light yellowish. Pronotum nearly three-fourths as long as broad, widening slightly posteriorly, dorsum pale yellowish-gray, sparsely covered with black bristles. Tegmina of ♂ usually covering about three-fourths of the abdomen, and fitting closely to the latter, pale yellowish, with the upper half or more of the lateral field shining black, a black streak along the dorsal field near the inner margin, and usually two or three smaller black patches near the base. Tegmina of ♀ usually covering about one-half the abdomen, the hind margin less convex than in *fasciatus*, pale testaceous, a shining black stripe along the upper third of the lateral field, a black streak on the dorsal field between its outer and middle thirds, and a few short streaks and spots on the inner two-thirds. Wings absent or fully developed, and extending beyond the tips of the hind femora by more than one-half their length. Abdomen in ♂ glossy black

on dorsal and lateral surfaces, grayish-yellow beneath; in ♀ with the dorsal surfaces of the first three segments shining black, elsewhere yellowish-gray, with a row of dark spots along the dorsum. Hind femora dark sooty brown above, with a few small light spots along dorsal surface, the dark colour extending down irregularly over about half or more of the inner and outer surfaces, where it is more or less broken into blotches; elsewhere pale testaceous, lighter internally. Legs dark sooty brown, variegated with pale testaceous. Ovipositor about as long as the body, and about one-fourth longer than the hind femora, nearly straight, stout, the apical blades tapering evenly to a fine point, the teeth sharp, prominent, and nearly equidistant.

Length of body, ♂ 7 mm., ♀ 8 mm.; pronotum, ♂ 1.5 mm, ♀ 1.75 mm.; tegmen, ♂ 3.5 mm., ♀ 2.9 mm.; hind femur, ♂ 5 mm., ♀ 6 mm.; ovipositor; 7.7 mm.

12 ♂♂, 13 ♀♀. Toronto, Aug. 16, Sept. 8, 1902; Sarnia, Aug. 16, 1901; De Grassi Pt., Lake Simcoe, Aug. 3, 1903; Sept. 15, 1901. I have a single long-winged female, taken at High Park, Toronto, Aug. 16, 1902.

This is a well-marked species, easily distinguished from *N. fasciatus* by its much smaller size, grayish coloration, more distinct dark markings and longer ovipositor. It has the longest ovipositor of any of our species.

It occurs only on sandy soil, where the vegetation is somewhat scanty. I have never taken it in large numbers, but in High Park, where all my Toronto specimens were taken, it is by no means scarce when looked for in the proper kind of locality. Its pale colours renders it very inconspicuous against the sand.

The chirp of the male is a feeble, continuous trill, more high-pitched than that of *fasciatus* or *angusticollis*, and much shorter than either.

4. NEMOBIUS FASCIATUS, De Geer. The Striped Ground Cricket.

Gryllus fasciatus, De G., Mem. pour serv. à l'hist. des ins., III., 1773, 552.

Nemobius fasciatus, Scudd., Mat. Mon. N. A. Orth., VII., 1862, 430.

Acheta vittata, Harr., Ins. Inj. Veg., 1862, 152.

Nemobius vittatus, Scudd., Mat. Mon. N. A. Orth., VII., 1862, 430.

Nemobius fasciatus vittatus, Beut., Bull. Amer. Mus. Nat. Hist., VI., 1894, 267.

Nemobius exiguus, Scudd., Mat. Mon. N. A. Orth., VII., 1862, 429.

Length of body, ♂ 9 mm., ♀ 10 mm.; pronotum, ♂ 1.5 mm., ♀ 2 mm.; tegmen, ♂ 5.5 mm., ♀, 4 mm.; hind femur, ♂ 6.3 mm., ♀ 7 mm.; ovipositor, 9 mm.

I have found this cricket in abundance in all parts of Ontario where I have made collections of Orthoptera. In this species the tegmina usually cover about three-quarters of the abdomen in the ♂, and about half the abdomen in the ♀, and in such specimens the wings are absent. This is the form that was formerly known as *vittatus*. Specimens with wings extending far beyond the end of the abdomen are often met with, however, and are most often seen at night, when they are attracted to light. These long-winged individuals are usually, but not always, females. Blatchley says of this species in Indiana: "During hundreds of days spent in field collecting, not a single specimen of the long-winged form was taken until Aug. 1, 1902, when it was found in numbers on the stems of long grass in a marsh bordering Round Lake, Whitley County." This has not been my experience, as I have frequently come across it in the field. On Aug. 26, 1901, I found large numbers of this form floating on Lake Huron, about a quarter of a mile from the south shore of the Bruce Peninsula. It was a hot, still day, and many other insects were seen floating in the same manner, notably two other Gryllidæ, the tree cricket, *Œcanthus fasciatus*, and the long-winged form of *Gryllus abbreviatus* This species reaches maturity towards the latter part of July, and continues until severe frost, usually in the early part of November.

Specimens from the south-west appear to average larger than those from the north. My largest ones are from Arner, Essex Co., close to the shore of Lake Erie.

Localities: Niagara Falls, Point Pelee, Arner, Chatham, Sarnia, Goderich, Southampton, Bruce Peninsula, Owen Sound, Hamilton, Toronto, Lake Simcoe, Severn River, Lake Muskoka, Algonquin Park, North Bay, Stony Lake (Peterboro' Co.).

Mr. Blatchley has called my attention to a small dark *Nemobius* which he has taken in Northern Indiana, Michigan, and in Ontario across from Buffalo, N. Y. I have also taken this form, and I agree with Mr. Blatchley in considering it to be a small degenerate form of *fasciatus*.

5. NEMOBIUS CANUS, Scudd.

N. canus, Scudd., Journ. N. Y. Ent. Soc., IV., 1896, 100, 103.

I have a single ♀ *Nemobius* taken at Arner, Ont., which agrees pretty well with Blatchley's description of *canus*. The head is light

reddish-brown, without any trace of the fuscous stripes which are so constant a feature in *fasciatus*. The general coloration is light reddish-brown, with the dark markings more distinct than in *fasciatus*. The eyes are more globose than is usual in that species. It may be only an atypical specimen of *fasciatus*, but it appears to show the chief peculiarities by which *canus* is known from the latter.

6. NEMOBIUS MACULATUS, Blatchley.

N. maculatus, Bl., Psyche, IX., 1900, 52.

On Aug. 22, 1903, when collecting near Tobermory, on the Bruce Peninsula, I found a small *Nemobius* in considerable numbers jumping about in a small patch of moss in the spruce woods. I captured 4 ♂ ♂ and 3 ♀ ♀, and on my return to Toronto sent a pair to Mr. Scudder, who named them *N. maculatus*. They do not agree with Blatchley's description in all respects, and I do not feel satisfied that they really belong to that species. The ovipositor in *maculatus* is equal to or very slightly shorter than the hind femora, whereas in my specimens it is slightly longer in one and distinctly longer in the other two. The tegmina are shorter than the average in *N. fasciatus*, but are longer than those of typical *maculatus*, according to the description. They agree with the latter in having fine cross veinlets in the ♂ tegmina. The coloration does not show the spotty pattern of *maculatus* in any marked degree.

Length of body, ♂ 8 mm., ♀ 8 mm.; pronotum, ♂ 1.5 mm., ♀ 1.6 mm; tegmen, ♂ 3.5 mm., ♀ 2.75 mm.; hind femur, ♂ 5 mm., ♀ 5.3 mm.; ovipositor, 6.5 mm.

7. NEMOBIUS PALUSTRIS, Blatchley. The Marsh Ground Cricket.

N. palustris, Bl., Psyche, IX., 1900, 53.

Length of body, ♂ 5.5 mm., ♀ 6 mm.; pronotum, ♂ ♀ 1 mm.; tegmen, ♂ 2.7 mm., ♀ 2 mm.; hind femur, ♂ 3.5 mm., ♀ 4 mm.; ovipositor, 3 mm.

On the 18th of August, 1903, I came across this handsome little cricket in a sphagnum swamp on the margin of Ragged Lake, Algonquin Park. The swamp bordered the lake for a few hundred yards about the mouth of a small creek, and was of a very interesting character. It was carpeted throughout with a deep growth of sphagnum moss, in which cranberries *(Oxycoccus macrocarpus)* were growing in the greatest profusion. Pitcher-plants *(Sarracenia purpurea)*, various Ericaceæ, such as *Andromeda polifolia* and *Chamædaphne calyculata*, were also conspicuous among the plants, the only trees being a few dwarf specimens of black

spruce and tamarack. For about a hundred yards beyond the margin of the creek the swamp was a true floating bog, and the trees very few and small; and it was here that the crickets were found. They were present in considerable numbers, but were very difficult to capture, and when alarmed would at once burrow down among the masses of sphagnum. By pressing these masses down under water, it was often possible to bring the crickets to the surface.

Mr. Blatchley, to whom I sent a pair, remarks that the specimens are smaller than typical ones from Indiana. They are much the smallest of the Ontario *Nemobii*.

My attention was first called to this species by its chirp, which is a continuous and rather feeble trill, very like that of *N. angusticollis*.

8. NEMOBIUS ANGUSTICOLLIS. New species.

N. palustris, Walk., Ann. Rep. Ent. Soc. Ont., 1901, 109.

Size medium, body of male very broad. Head small but prominent, dark shining brown, more or less obscurely trifasciate above with darker brown, rather scantily covered with black bristles. Eyes small but prominent, oval. Maxillary palpi light brown, the terminal joint infuscated apically. Pronotum nearly smooth, somewhat shining dark piceous, more or less faintly variegated with lighter brown, sparsely covered with black bristles; slightly narrower at the anterior margin than the head, about equal to it in width at the hind margin; a rather deeply impressed median longitudinal line on the anterior half. Tegmina of ♂ reaching tip of abdomen, very broad, the dorsal breadth being much greater than that of the pronotum, but fitting pretty closely to the abdomen; uniform deep shining piceous. Tegmina of ♀ covering about two-thirds of the abdomen. Wings absent or fully developed, and extending beyond the tips of the cerci. Legs and abdomen fuscous, the former more or less variegated with pale testaceous, the hind femora without bands upon the inner surface. Ovipositor a little more than one-half as long as the hind femora, slightly arcuate, and feebly expanded at the base of the apical fourth, each blade bearing an irregular row of rather sharp teeth, the basal ones fine and close together, the apical coarse and unusually far apart.

Length of body, ♂ 8 mm., ♀ 8.5 mm.; pronotum, ♂ 1.5 mm., ♀ 1.6 mm., tegmen, ♂ 5.4. mm., ♀ 3.4 mm.; hind femur, ♂ 4.5 mm., ♀ 5 mm.; ovipositor, 3.3 mm.

This species is most related to *N. confusus* and *N. palustris*, and also resembles *N. exiguus* in some respects. It differs from all three in

the smaller head and narrower pronotum, the width of which, in *angusticollis*, is less than the dorsal field of the tegmina in their natural position. It differs from *palustris* in the much greater size, the longer and broader tegmina in the male, lighter maxillary palpi and shorter ovipositor, with more irregular teeth. From *confusus* the male of *angusticollis* differs in the longer and broader tegmina, those of *confusus* covering only three-fourths of the abdomen, and in the uniform coloration of the hind femora, those of *confusus* being blotched and spotted on the inner surface. The females of *angusticollis* approach those of *confusus* so closely that they are separated with difficulty. The last two joints of the maxillary palpi in the latter are white, those of the former light brown; the hind femora and ovipositor are somewhat shorter in *confusus*, while the pronotum as mentioned before is broader than in *angusticollis*. From *exiguus*, *angusticollis* differs in the much darker and more uniform coloration, the much broader body and tegmina in the male, narrower hind femora, and in the somewhat longer and more sharply-toothed ovipositor.

Although neither has been reported from Ontario, I have figured both *exiguus* and *confusus* from specimens kindly loaned me by Mr. Blatchley, because it is thought that this will aid in the separation of these difficult species, and it is quite possible that both, especially *exiguus*, will eventually be found to occur in Ontario. *Angusticollis* is, next to *fasciatus*, the commonest *Nemobius* in Ontario. It frequents low grounds of almost any kind, but delights especially in low grassy borders of swampy woods or clearings in swamps. I have found it in abundance in sphagnum moss when growing in such localities, but have not met with it in the open peat-bogs where *N. palustris* occurs. It is also found beneath stones along the margins of lakes and streams.

I first discovered this insect through its stridulation, which I heard among the granite boulders which line the shores of Lake Simcoe at De Grassi Pt. It was a high-pitched continuous trill of considerable volume, and although I could approach the performer within a few feet, it was always necessary to disturb the rock in order to expose him. This, of course, not only silenced him, but allowed him to make himself scarce, and it was not until after repeated efforts that I at last secured one of the little musicians.

Of the long-winged form I have but a single pair, a male taken at De Grassi Pt., July 30, 1901, and a female from the Severn River, Aug. 24, 1898.

This species reaches maturity about the last week of July, and continues till November.

Localities: Toronto, Sept.-Nov.; Lake Simcoe, July 29–Sept. 14; Sarnia, Aug. 15, 1901; Southampton, Aug. 20, 1901; Owen Sound, Aug. 31, 1901; Severn River, Aug. 24, 1898.

(To be continued.)

EXPLANATION OF PLATE 4.

1. *Nemobius griseus*, nov. sp., ♂.
2. " " " " ♀.
3. " *fasciatus vittatus* (De G.), Harr., ♀.
4. " *maculatus* (?), Blatch., ♀.
5. " *exiguus*, Blatch., ♂.
6. " " " ♀.
7. " *confusus*, Blatch., ♂.
8. " " " ♀.
9. " *angusticollis*, nov. sp., ♂.
10. " " " " ♀.
11. " *palustris*,, Blatch., ♂.
12. " " " ♀.

All the figures are magnified two and one half diameters.

THE REVEREND P. JEROME SCHMITT.

We regret to chronicle the death of the Rev. P. Jerome Schmitt at St. Vincent's College, near Beatty, Pa., on April 27th. Father Schmitt was well known to the entomological world as a most careful and able worker, generous with his specimens and his time. He will be sadly missed by those who had the privilege of his acquaintance.

Father Schmitt was born at Neuhausen, Wurtemberg, May 30, 1857; he came to St. Vincent's College in 1869, and in 1876 joined the Benedictine Order. In 1881 he was ordained priest of the Roman Catholic Church, and spent the greater part of the remaining years of his life in teaching the classics at the College. He found time for a great deal of close work with the Coleoptera, and was especially devoted to the study of some of the minute Clavicornia, as will be seen by reference to the writings of present-day authors. At the time of his seizure by the disease which resulted in his death, he was engaged on a descriptive catalogue of the Pselaphidæ collected in Brazil by H. H. Smith.

His collections and manuscripts remain at the College where his life was spent, and the material collected by him will no doubt be carefully preserved by his confreres. It has formed the basis of numerous records in Dr. Hamilton's Catalogue of the Coleoptera of Western Pennsylvania, and has furnished types of many new species described during the past ten years.—H. F. W.

SYNOPSIS OF BEES OF OREGON, WASHINGTON, BRITISH COLUMBIA AND VANCOUVER.—III.

BY H. L. VIERECK, ASSISTED BY T. D. A. COCKERELL, E. S. G. TITUS, J. C. CRAWFORD, JR., AND M. H. SWENK.

ANDRENA, Fabr., and OPANDRENA, Robt.

Females.

Third joint of antennæ equal to 4 + 5, or very nearly ..... 1.
Third joint of antennæ longer than 4 + 5 ..... 4.

1. Scopa ample, compact, the hairs long and curved up ..... 2.
   Scopa with the hairs short and straight ..... 3.
2. Abdomen punctured; dorsulum closely indistinctly punctured, not metallic; enclosure very finely rugulose, almost smooth ..... *viburnella.*
   Abdomen not punctured.
   Without distinct narrow fasciæ.
   Fovea about as broad as one-half the distance between lateral ocellus and eye margin.
   Enclosure granular, very nearly rugulose; abdomen black ..... *melanochroa.*
   Enclosure very finely granulated, abdomen greenish ..... *chlorogaster.*
   With distinct narrow fasciæ.
   Dorsulum impunctate or with indistinct punctures; abdomen black; dorsulum dull.
   Second abdominal segment with a broad whitish testaceous margin at apex ..... *Illinoiensis.*
   Abdominal segments not broadly testaceous; green or greenish or blue.
   Enclosure nearly smooth; abdomen greenish ..... *Piperi.*
   Enclosure rugulose; abdomen distinctly green ..... *chlorinella.*
   Abdomen distinctly blue ..... *candida.*
3. Metatarsus of posterior legs one-half as wide as the tibiæ at apex; enclosure smooth; abdomen indistinctly fasciate ..... *angustitarsata.*
   Metatarsus of posterior legs more than one-half as wide as the tibiæ at apex.
   Abdomen fasciate; clypeus indistinctly punctured, dull.
   Enclosure smooth; pubescence abundant on the clypeus; pubescence of dorsulum gray ..... *mustelicolor.*
   Enclosure smooth; pubescence sparse on the clypeus ..... *subtilis*

4. Abdominal segments depressed nearly to the base..*trachandrenoides.*
Abdominal segments not unusually depressed.
Abdomen distinctly punctured.....5.
Abdomen not distinctly punctured.....8.

5. Enclosure coarsely rugose, at least at base; dorsulum with very distinct punctures; superior surface of metathorax rather convex..6.
Enclosure not coarsely rugose; nearly smooth.....7.

6. Abdomen shining; hair of dorsulum and face white or pale ochreous.
Abdomen black.
Pubescence white.....*Kincaidii.*
Pubescence yellow.....*Kincaidii* var.
Abdomen red, at least partly.....*Kincaidii*, var. *Pascoensis.*
Abdomen dull; hair of dorsulum and face bright fulvous....*Vernoni.*

7. Punctures of abdomen sharply defined; posterior tibiæ dark; enclosure rather rugose.....*Cressoni.*

8. Abdomen fasciate, with rather dense appressed hair bands.....24.
Abdomen usually without dense appressed hair bands, where they occur they are not broad, and the abdomen is tessellate punctate.....9.

9. Abdomen with more or less abundant erect pale hair.....20.
Abdomen with no conspicuous erect pale hair.....10.

10. Abdomen and scopa with pale pubescence.....11.
Abdomen and scopa with black or very dark pubescence.....17.
Abdomen with black pubescence; scopa with pale pubescence...16.

11. Abdomen very distinctly punctate tessellate.....12.
Abdomen not distinctly punctate tessellate.....13.

12. Clypeus finely punctured, almost granular.....*pulverulenta.*

13. Length over 11 mm.....14.
Length less than 11 mm.....15.

14. Dorsulum impunctate.....*seminigra.*

15. Abdomen with lateral patches of silvery appressed pubescence.....*subaustralis.*

16. Pubescence of dorsulum black.....*indotata.*

17. Enclosure smoother, only partly rugose.
Abdomen tessellate punctate.....18.
Abdomen not punctured.....19.

18. Punctures of abdomen dense.
    Face with black hairs; first recurrent nervure received before the middle of the second submarginal cell; dorsulum with reddish pubescence ..... *Halli.*
    Face with ochreous hairs; first recurrent nurvure received beyond the middle of the second submarginal cell; pleura with pale pubescence ..... *solidula.*
    Face with ochreous hairs; first recurrent nervure received before the middle of the second submarginal cell; pleura with pale pubescence ..... *junonia.*
    Face with pale to dark brown hairs; pleura with pale pubescence ..... *compactiscopa.*
  Punctures of abdomen not dense.
    Pubescence of dorsulum ochreous.
      Pleura pale ..... *vicina.*
      Pleura black.
        Abdomen black.
          Dorsulum entirely pale.
            Face with pale pubescence; first recurrent nervure received before the middle of the second submarginal cell ..... *Carlini.*
            Face with black pubescence; first recurrent nervure received beyond the middle of the second submarginal cell.
              Enclosure smooth ..... *neurona.*
              Enclosure partly rugose ..... *pluvialis.*
          Dorsulum with a black band ..... *transnigra.*
        Abdomen blue ..... *Seattlensis.*
19. Clypeus sparsely punctured, especially in the middle.
  Clypeus deeply punctured.
    Abdomen blue, with a greenish cast ..... *Chapmanæ.*
    Abdomen greenish and purplish ..... *Chapmanæ* race.
    Abdomen black.
      Scopa very compact ..... *Pullmani.*
      Scopa loose ..... *longihirtiscopa.*
  Clypeus not deeply punctured ..... *vicinoides.*

20. Scopal hairs long and curved ..... 21.
Scopal hairs short and straight ..... 22.
Abdomen covered with pale hairs except at apex ..... 23.
Abdomen only partly covered with pale hairs.
First abdominal segment with pale hairs.
Posterior legs black or nearly ..... *saccata.*
First and second abdominal segments with some pale hairs; scopa pale.
Clypeus rather sparsely punctured, especially in the middle ..... *hemileuca.*
Clypeus rather densely punctured ..... *clypeoperaria.*

22. Scopa thinly pubescent ..... *advarians.*
Scopa densely pubescent ..... *Washingtoni.*

23. Clypeal punctures fine and dense.
Nearly all scopal hairs white.
Pubescence on abdomen abundant; anal fimbria white, tinted with brown ..... *moesta.*
Only the lower half of the scopa with pale or white hairs ..... *albihirta = perarmata.*
Clypeal punctures large and sparse.
Dorsulum with sparse pubescence; first two segments of abdomen no more pubescent than the remaining segments ..... *Harveyi.*
Dorsulum with abundant pubescence; first two segments of abdomen distinctly more pubescent than the remaining segments ..... *asmi.*

24. Fovea about one-half as wide as the distance between the eye and lateral ocellus ..... 26.
Fovea distinctly broader than one-half the distance between the eye and lateral ocellus.
Process of labrum ordinary, truncate or rounded ..... 25.
Process of labrum various, as long as broad at base, quadrate, finger-shaped, emarginate or pointed ..... 27.

25. Clypeus with a distinct median impunctate space or the punctures sparse.
A clearly defined median impunctate space on the clypeus ..... *medionitens.*
No clearly defined median impunctate space on the clypeus ..... *semipolita.*

Clypeus closely punctured.
Dorsulum with pale pubescence.
Abdomen greenish, purplish or bluish.
First recurrent nervure received by the second submarginal cell before the middle ; anal fimbria bright brown ..... *xanthostigma.*
First recurrent nervure received by the second submarginal cell beyond the middle ; anal fimbria sooty.
Abdomen dull ; stigma pale ..... *candida.*
Abdomen rather shining; stigma dark ..... *subcandida.*
Abdomen black.
First recurrent nervure received by the second submarginal cell before the middle ; abdomen thinly subfasciate ..... *decussata.*
First recurrent nervure received by the second submarginal cell beyond the middle; abdomen not fasciate. *decussatula.*
Abdomen fasciate ; dorsulum dull, apparently impunctate ; clypeus not hidden by pubescence ; abdomen greenish ..... *subdistans.*

26. Enclosure not rugose.
Clypeus dull impunctate ..... *plana.*
Clypeus dullish, dense, with indistinct punctures ..... *auricoma.*
Clypeus rather closely punctured, but not densely ..... *scurra.*

27. Process of labrum finger-shaped ; scopa compact .... *Macguillivrayi.*
Process emarginate, but not deeply.
Posterior legs pale ..... *nubilipennis.*
Posterior legs dark ; abdomen fasciate ; anal fimbria dark brown ..... *W-scripta.*

ANDRENA.

Males.

Cheeks produced into a rounded angle ..... 1.
Cheeks regularly rounded, not angulate ..... 10.

1. The angle opposite or below the middle of the eye ..... 2.
The angle above the middle of the eye ..... 7.
2. Angle opposite the middle of the eye ..... 3.
Angle below the middle of the eye ..... 6.
3. Joint 3 shorter than 4 ..... *hemileuca.*
Joint 3 longer than 4, but shorter than 4 + 5 ..... 4.
Joint 3 about equal to 4 + 5 ..... 5.

4. Abdomen with black pubescence. ....*solidula*.
Abdomen with pale pubescence.
Fasciæ absent..... .....*decussata*.
5. Pubescence on face and thorax partly black.....*Harveyi*.
6. Pubescence white.....*viburnella*.
Pubescence ochreous..... .....*viburnella* var.
7. Mandibles armed with a tooth at base.....8.
Mandibles not armed with a tooth at base.....9.
8. Pubescence of abdomen pale and black; joint 3 much longer than 4, but not as long as 4 + 5 .....*advarians*.
Pubescence of abdomen pale.
Pubescence fulvous; joint 3 = 4 or nearly .....*asmi*.
Pubescence white; joint 3 much longer than 4, but not as long as 4 + 5.....*perarmata*.
9. Abdomen black.
Pubescence white .....*subaustralis*.
Pubescence ochreous to fulvous .....*subaustralis* var.
10. Joint 3 about = to 4..... .....11.
Joint 3 distinctly longer than 4, but shorter than 4 + 5 .....13.
11. First recurrent nervure received by the second submarginal cell before the middle ....12.
First recurrent nervure received by the second submarginal cell beyond the middle; abdomen blue.....*cundida*.
12. Dorsulum punctured (species not determined).....
Dorsulum impunctate.....*angustifovea*.
13. First recurrent nervure received by the second submarginal cell before the middle.....14.
First recurrent nervure received by the second submarginal cell in or beyond the middle.....17.
14. Abdomen punctured ....15.
Abdomen impunctured .....16.
15. Metathorax smooth .... *W-scripta*.
16. Enclosure granular.
Pubescence dense; antennæ pale in front.....*Illinoiensis*.
Pubescence thin; antennæ black in front.....*melanochroa*.
Enclosure indistinctly striated.
Stigma dark brown; pubescence of dorsulum fulvous..*medionitens*.
Stigma pale; pubescence of dorsulum pale ochreous...*microsoma*.

17. Abdomen fasciate or subfasciate ..... 18.
Abdomen not at all fasciate ..... 24.
18. Abdomen densely clothed with ochreous pubescence ..... *trachandrenoides.*
Abdomen not densely clothed with ochreous pubescence ..... 19.
19. Legs pale, wings yellow ..... *auricoma.*
Legs dark, wings not yellow, pale ..... 20.
20. Dorsulum shining ..... *scurra.*
Dorsulum dull ..... 21.
21. Abdomen blue ..... *Seattlensis.*
Abdomen black ..... 22.
22. Pubescence bright fulvous ..... *Washingtoni.*
23. Large 10 mm.; fasciæ rather distinct ..... *Macguillivrayi.*
Smaller 8 mm.; fasciæ rather indistinct ..... *Pullmani.*
24. Abdomen with some black pubescence ..... 25.
Abdomen with no black pubescence ..... 26.
25. Face and legs with black hair ..... *Carlini.*
Face and legs with pale hair ..... *saccata.*
26. Cheeks not twice as broad as the eye ..... *vicina.*
Cheeks twice as broad as the eye ..... *pulverulenta.*

OPANDRENA and PTERANDRENA.

Males.

Joint 3 longer than 4, shorter than 4 + 5.
Abdomen more or less distinctly punctured ..... 1.
Abdomen impunctate ..... 4.
1. Tibiæ pale ..... 2.
Tibiæ dark ..... 3.
2. Abdomen shining; indistinctly fasciate; pubescence whitish .. *Kincaidii.*
pubescence fulvous .. *Kincaidii* var.
Abdomen dull, distinctly fasciate ..... *Vernoni.*
3. Abdomen rather indistinctly punctured; scutellum polished .. *Trevoris.*
Abdomen distinctly punctured; scutellum dull ..... *Cressoni.*
4. Dull; distinctly fasciate ..... *mustelicolor.*
Joint 3 longer than 4 + 5; abdomen shining subfasciate .... *pallidifovea.*

Andrena viburnella, Graen. CAN. ENT., XXXV., 1903, p. 165.

♀, 6th, 7th June, 1899, Corvallis, Or. (Cordley); ♂, 27th April, 1895, Almota, Wash. (C. V. Piper); 17th April, 1896, Livingston, Vanc.; Victoria, B. C. This may be the same as *A. perplexa*, Sm.

Andrena melanochroa, Ckll. Ent., Lond., 1898, p. 89.

♀, 25th May, 1894, Olympia, Wash.; ♂, 15th May, 1894, Olympia, Wash. (T. Kincaid); ♀, 18th May, 1896, Livingston, Vanc. (2119).

Andrena chlorogaster, n. sp.

♀ 6 mm. A small, almost entirely impunctate species, with pale hairs in the fovea, pale pubescence and dark brown stigma.

Type locality: Oregon. Type Am. Ent. Soc., Phila.

Andrena Illinoiensis, Robt., Trans. Am. Ent. Soc., Phila., XVIII., p. 54.

♀, 16th April, 1897; ♂, April, 1895, Pullman, Wash. (C. V. Piper).

Andrena Piperi, n. sp.

♀ 7 mm. Dull black, finely sculptured, impunctate, covered with white pubescence, stigma pale brown.

Type locality: Pullman, Washington. Type Univ. of Nebraska.

Andrena chlorinella, n. sp.

♀ 8 mm. Pubescence white; fovea nearly black; dorsulum purplish and greenish; abdomen blue and greenish; anal fimbria nearly black.

Type locality: Corvallis, Oregon. Type Acad. Nat. Sci., Phila.

20th May, 1899, at the type locality (Cordley).

Andrena candida, Sm. New Spec. Hym. Brit. Mus., p. 55.

♀, 18th June, 1895, Olympia, Wash. (T. Kincaid); ♂, 18th June, 1895, Olympia, Wash. (T. Kincaid); April, Pullman, Wash. (R. W. Doane), Vancouver (Sm.).

Andrena angustitarsata, n. sp.

♀ 9 mm. Pubescence ochreous; fovea ochreous. This is a stylopized specimen, and may be an aborted *A. subtilis*, the abortion due to the presence of the stylops.

Type locality: Washington. Type Am. Ent. Soc., Phila.

Andrena mustelicolor, n. sp.

♀ 9 mm. Pubescence mouse gray; anal fimbria and fovea brownish.

Type locality: Pullman, Washington. Type Univ. Nebraska.

♀, Pullman, Wash. (C. V. Piper); ♂, 9th May, 1899, Corvallis, Or. (Cordley).

Andrena subtilis, Sm. New Spec. Hym. Brit. Mus., p. 55.

♀, July, 1898; 4th May, 1898; 7th May, 1899; 8th June, Corvallis, Or. (Cordley); ♂, Pullman, Wash. (C. V. Piper); Vancouver (Sm.).

(To be continued.)

NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, S. B., M. D., DECATUR, ILL.

(Continued from page 173.)

Mamestra elsinora, n. sp.—Expanse: 37 mm.

General colour very dark blackish brown, with a slight purplish tinge, quite smooth and somewhat shiny. Ordinary markings jet black, but not conspicuous, owing to the similarity in shade with the ground colour. The distinct black, more or less solidly filled claviform and the yellow-filled reniform are the most conspicuous features in the maculation. Basal line present though fragmentary, represented by two blackish dots on costa, in one specimen with some whitish scales between them, forming a more or less evident dot, in the other specimen this is not so noticeable, the line is also evident between the median and submedian veins, though in a lighter, diffused sort of way. Just above the median vein is a small yellow point, quite distinct in one specimen, faint in the other. T. a. line transverse, more or less outwardly scalloped between veins, in a few places, especially on the costa, showing as a double line, with a somewhat paler filling. The outer line is the more easily traced, but even this is not very distinct without a lens. A narrow median shade can be made out running from costa downward and outward to lower edge of reniform, thence to inner margin very close to termination of t. a. line. T. p. line only moderately exserted over cell, thence parallel to outer margin in a quite direct line to inner margin, inwardly scalloped between veins. An outer accompanying line is only indicated here and there by a few scales and a tendency to a lighter filling between the two is evident though very faintly marked. S. t. line fragmentary, wavy, showing a mixture of black and yellow scales, with the naked eye the yellow can be traced as a faint fragmentary line across the wing and the black as two closely approximate sagittal dashes opposite cell, extending almost to reniform and usually one smaller one just below costa. With the lens these sagittal marks can be traced more or less plainly across the wing, and the yellow scales seem to be imbedded in them. There are fine yellow points at the termination of veins, which have a tendency to extend outward, more or less completely through fringe, giving it a faintly checkered appearance. Fringe concolorous, with a very faint, wavy, lighter mesial line. Orbicular moderate in size, narrowly black ringed, within which the lens shows indications of a fine yellowish line.

Reniform moderate in size, erect, surrounded by a black line, which is, however, somewhat broken and of uneven width, outwardly broadly yellow-filled, inwardly to a lesser degree, this yellow colour in one specimen largely fills the spot, in the other it is broken and fragmentary. Claviform conspicuous, black-filled, crosses t. a. line, and in some instances its lower fork almost, if not quite, reaches basal line. Hind wings with a broad blackish fuscous outer border, inwardly much lighter. Discal dot well marked. Mesial band faint, lighter, hard to follow from its being merged in fuscous border. Fringe, outer portion whitish, inner half fuscous, with pale wavy yellowish-white line at base.

Beneath: fore wings dark fuscous, more or less mixed with gray along costa and outer margin. Mesial line evident, though not prominent. Discal dot present. Hind wings dark grayish fuscous along costa and external margins, paler centrally. Well-marked mesial band and discal dot. Head, collar and thorax slightly darker than wings. Abdomen fuscous, paler at base. One or two dorsal tufts at base, though not prominent. Palpi blackish outwardly, lighter inwardly. Tongue yellowish, at root of tongue on either side, when seen with lens, a small tuft of bright orange hair. Thorax, abdomen and legs dark smoky fuscous. Eyes hairy. Antennæ broadly bipectinate, pectinations terminating in one or two fine ciliæ. Antennæ light yellowish fuscous.

Types: 2 ♀'s, Huachuca Mts., Ariz.

Mamestra hueco, n. sp.—Expanse: 35 mm.

General colour a light yellowish brown or tan with darker coloured or purplish brown markings, relieved by whitish shades, especially in the median space. Palpi yellowish at tip, reddish outwardly. Head yellowish. Collar tan-coloured, yellowish at base, tipped with whitish. Patagia purplish-tan, somewhat darker than collar, bordered and tipped with whitish. Thorax tan, moderate posterior thoracical tuft. Abdomen tan and purple shades, latter most pronounced at the posterior part and former at the anterior part of the segment, anal tuft distinct and well marked. Abdomen at sides, below the middle, densely coated with tan-coloured hairs, having a tendency to arrange themselves in tufts. Fore wings, basal half line distinct, purplish, in the centre just above median veins a prominent broad, solid tooth of the same colour projects almost to the t. a. line, there is also a small tooth above and below the median one. The lower one of these is almost or quite connected with a

similar inwardly-projecting tooth on the t. a. line by a band of the same colour. The basal line is bordered inwardly by a well-marked reddish band, which extends beyond it to the submedian vein, thence outward as an accompanying shade. T. a. line distinct, purplish-brown, transverse. Two inwardly-projecting teeth just above and below the median vein, forming a well-marked W, as above mentioned they show a tendency to connect with the basal line, the lower part of the line forms a single broad scallop to inner margin, there is an accompanying whitish shade on the outer side, and at inner margin a slight indication of an accompanying purplish line. T. p. line distinct, vinous, somewhat irregular in width, exserted over cell in a somewhat quadrangular manner, thence to inner margin in a couple of broad waves. The line is peculiar in that it does not extend entirely to costa, but turns inward at quite a sharp angle and follows parallel to costa and at about ½ mm. removed from it, as a narrow purplish line as far as outer edge of orbicular. The line itself, as well as the prolongation, is bordered within with a lighter diffuse whitish shade. At inner margin the line is accompanied on its inner side for a short distance by an accompanying line. The veins through the median space are very delicately and lightly tinted with purplish and also accompanied by whitish shades. The median shade is diffuse, scarcely, if at all, to be traced except from inner margin to lower edge of reniform. S. t. line pale yellowish, scalloped, bordered within and without with purplish, on the outside this purplish border projects along veins as sharp teeth to terminal line. The veins in the subterminal space and especially in the centre of the wing are quite heavily coated with purplish shades, which almost, if not quite, join in many places, connecting the purple shades of the t. a. and s. t. lines. There is a purplish terminal line composed of shallow lunules, these are accompanied inwardly by a pale yellowish shade, which gradually darkens as it approaches the s. t. line. Fringes pale at base, purplish outwardly, cut with paler at termination of veins, in some specimens there is an extremely faint median lighter line. Pale yellowish spots on costa at inceptions of basal and t. a. lines, one over cell and three similar dots on apex. Orbicular quite large, subquadrate, quite evenly tan-coloured, bordered outwardly with pale, within which is purplish ring, varying in width, in general much broader in the superior half. Reniform large, slightly oblique, constricted in centre, purplish and light ring the same as orbicular, centre somewhat paler. In one specimen before me

there is, at the inner upper edge of reniform, a small purplish dot, surrounded by the prolongation of the yellowish border, a corresponding dot of similar size is at the outer upper edge of the orbicular. In other specimens these spots are fused with the purple rings of the ordinary spots, forming slight projections on them, in some specimens they are separate on one side, united on the other. Claviform is present, distinct, though not prominent, lighter tan-coloured outlined in pale yellow. Hind wings pale yellowish, semitranslucent, slightly darker outwardly and along veins.

Beneath: fore wings yellowish, paler than above, longitudinally streaked with purplish in middle of wing, from base to end of cell, some purplish streaks at base. Hind wings pale yellowish-white, slightly purplish along costa and at upper angle. Two or three purplish spots along veins towards costa, the only indication of a mesial band. On primaries the purplish shades terminate rather abruptly and are here somewhat thickened along the veins, giving a rather faint resemblance to mesial band. Discal spots only apparent as a few faint dark scales, under lens, not apparent to the naked eye. Abdomen below rusty tan colour, more or less mixed with purplish. Legs banded yellowish and purple.

Types: ♂ and ♀, Huachuca Mts., Ariz.

Admetovis similaris, n. sp.—We have received at various times a number of specimens of an insect showing on superficial examination so much similarity to *oxymorus*, Grt., that we have without further investigation placed them together. We find both forms likewise in the National Museum and Henry Edwards's collections, and, if we remember correctly, also in that of Mr. Neumoegen. Both forms seem to occur in the same locality, as we have examples of each from Arizona and S. California. *Oxymorus* we also have from Colorado. Grote's figure (Bull. Buff. Soc., Vol. I., p. 133, Pl. iv., fig. 5) leaves no doubt as to which form he had before him when he made his description, and for the other, of which we now have six specimens before us, evenly divided as to sex, we propose the name *similaris*. The most obvious distinguishing feature lies in the secondaries, which in the new variety are semi-translucent, white with a faint yellowish tinge, and show none of the yellowish brown scales which almost, or quite, cover the wing in *oxymorus*. A few faint dots in two of the females suggest a mesial line, and a very faint discoloration in one female towards anal angle and

a slight darkening of some of the veins, especially in the female, are all that mars the otherwise uniform clearness of the wings. In *oxymorus* the darker portions of the fore wings are frosted with white, more or less obscuring the markings and giving a powdery appearance to the wings. In *similaris* these portions are smooth, even, dark iron-gray, neater and cleaner looking, not so "mussed up." The basal and t. a. lines are fine, black and more distinct than in the older species. No trace of claviform, except in one specimen, and that very faint, while in *oxymorus* it is quite marked. The t. p. line is exserted further beyond cell and on inner margin comes closer to the t. a. line. The upper of the two dark patches beyond s. t. line is more triangular, and the lower extends farther in towards t. p. line.

Types: 3 ♂'s, 3 ♀'s. So. California, March and May; Arizona, April and May.

Tæniocampa alamosa, n. sp.—Expanse: 34 mm.

Ground colour yellowish-brown or sepia, markings darker shades of the same colour, with a vinous or purplish cast. Ordinary lines double distinct, pale-filled, basal half line well marked crenulated, outer portion emphasized just above median vein by a small, rather broad toothed projection, surrounded by the same shade as the filling. T. a. line transverse, irregular, cut by the somewhat lighter veins, outer portion heavier than inner. Median shade well marked, passes almost directly across wing from inner margin to costa, between reniform and orbicular, it is also cut by the lighter veins and slightly lunulated between them, especially in lower half. T. p. line well-defined, moderately exserted over cell and slightly incurved below it, consists of a series of lunules between veins, the lunular character being more marked opposite cell. S. t. line distinct, pale yellowish-tan, wavy, emphasized by a preceding rather purple shade, which is made up of lunules between the veins, the line being almost or quite cut by them. The terminal space has a row of terminal lunules projecting between them, both being of a purplish colour. These purplish lunules are continued through the fringe, which otherwise is of a lighter colour. Orbicular moderate in size, subquadrate, slightly inwardly oblique, pale-ringed, purplish-filled, somewhat lighter centrally. Reniform of good size, erect, moderately constricted, pale-ringed, purplish-filled, somewhat lighter centrally. Hind wings yellowish-white, slightly darker along extreme edge. Veins somewhat darker, fringe concolorous.

Beneath: fore wings pale yellowish, somewhat darker centrally, quite uniform double outer line well-marked on costa towards apex, fading out below. Veins, especially towards apex and outer margin, somewhat covered with purplish scales. Some ochre-coloured hairs at base of wing and inner margin. The central portion of wing is also thinly-covered with moderately long white hairs. Hind wings pale yellowish, costal edge and veins somewhat darkened. Palpi yellowish inside, mixed with purple outside. Head, collar and thorax mottled tan and purplish, arranged on collar in alternate bands. The scales at front of thorax, just behind collar, are of a more ochraceous tint. Abdomen pale yellowish, slightly darker than secondaries. Beneath: legs yellowish internally, purplish and tan externally.

Type: ♂ and ♀, Huachuca Mts., Ariz.

Tricholita chipeta, n. sp.—♂ 32 mm., ♀ 35 mm.

In many collections will be found specimens of a species of *Tricholita* from Colorado, under the name of *fistula*, Harv., most of these came from either Mr. Bruce or myself. At the time these were distributed I had no specimens of Harvey's species from California, from which locality the types originally came, and so had no reason to doubt the correctness of the identification. Having recently, however, received specimens from California which agree much more nearly with Harvey's description, I feel certain they are the true *fistula*, and that we have in the Colorado specimens a distinct species. There is no question but that the two species I have before me are perfectly distinct. In a series of eight specimens from Colorado, evenly divided as to sex, the following variations from the Californian ones are constant: The arrangement of the white spots in the form of a pipe (mentioned by Harvey) is very clear in the Californian specimens, in the Colorado ones the upright row of spots is more rigid, not so curved, and the inner spot corresponding to the bowl of the pipe is in all the specimens prolonged inwardly as a sharp spur varying in length, in some specimens reaching as far as the inner edge of the orbicular, it is bordered above and below by a more or less distinct black line. The claviform is plainly marked, neatly outlined in black in all Colorado specimens, while no trace of it can be seen in the others. The orbicular is drawn out in a longitudinal direction, and in some specimens is continued quite a distance inwards towards the base, in other specimens there is a single black line running inwards from orbicular. In

some specimens the cell is considerably darkened, in others very slightly so. The secondaries are whitish, dusky along margins in male, in the female dusky throughout, though somewhat lighter at base. Fringe dusky at base, white externally. Beneath *fistula* is much darker and has a well-marked mesial line on both wings, of which there is no trace in the Colorado form.

As a whole they are quite different looking insects, aside from the difference in markings, and, if I am correct in the identification of Harvey's species, there can be no doubt but that the Colorado ones are new.

Types: Glenwood Springs, Colo.

Cucullia agua, n. sp.—♂ expanse, 44 mm.; ♀, 46 mm.

General type of maculation recalling *convexipennis*, ground colour a rather clear bluish gray, with a faint reddish-brown flush, markings in brown varying in shade from light reddish through dark umber to almost black. Transverse lines almost obsolete. Extreme base of wing dark umber brown, with a small white spot next to costa. Inner margin with narrow dark brown, almost black, line. A prominent dash above inner angle of same colour, interrupted at its inner fourth by a pale lunule. A small blackish spot below costa, just before orbicular, and a larger, more diffuse one between reniform and orbicular from costa to median vein. The latter is continued as a faint shade obliquely to inner angle. The wing between this band and base is a rather clear gray, only very faintly tinged with reddish brown; beyond the band and above the median vein the wing is a light brown, slightly darker outwardly and above, the costa being, however, narrowly gray, with two or three pale dots and one or two outwardly oblique short black dashes. Beyond the band below median vein the wing is gray but considerably washed with brown, especially outwardly. The veins, especially the median and its branches, are darkened. Orbicular small round, brown, with faint interrupted blackish limiting line. Reniform moderate in size, upright, kidney-shaped, limiting line dark umber brown, outwardly more blackish, inwardly fragmentary. The spot is not conspicuous, being concolorous with the brown subapical shade which embraces it. The t. a. line is almost obsolete, but on very close inspection it can be made out. It makes a wide, outwardly projecting

tooth below median vein. There is a dark brown interrupted terminal line. Fringe concolorous with adjacent portion of wing, paler at base. Hind wings soiled white, shading into fuscous outwardly, veins darkened, fringe white.

Beneath fore wings smoky, paler on inner half of inner margin, costa somewhat more gray. Quite a coating of long hairs on wing below costa over cell. Secondaries soiled white, darker outwardly and along costa. Palpi blackish outwardly, pale brown within. Head dark, black and gray mixed. Collar pale brown, largely mixed with gray, in front and through middle antero-posteriorly dark brown, almost black. A darker brown mesial band, narrowly edged with white anteriorly. Patagia gray, more or less edged with black. Abdomen fuscous. Fan-shaped dorsal tuft at base and two or three more rounded ones behind it, dark blackish gray. Thorax and abdomen beneath pale yellowish brown. Legs yellowish brown inwardly, more or less gray outwardly, tarsi darker brown.

♀ resembles ♂ closely, but fore wings are more obscured with dark blackish brown; the oblique median shade being much darker. Ordinary spots more constrasting and have dark brown centres. Hind wings darker, basal area more obscured.

Types: 1 ♂, 1 ♀. Huachuca Mts., Ariz. One specimen from Mr. Poling, the other of my own collecting.

(To be continued.)

A SYNTOMID FAR AWAY FROM HOME.

I have on several occasions had specimens of both the European and Oriental cockroaches sent me by fruit dealers, who had found them on bunches of bananas, and there was a report of the capture of a large scorpion, said to be over five inches in length, on a bunch at Spokane, Wash., but the most interesting capture that I have to record is a beautiful freshly-emerged specimen of *Ceramidia Butleri*, Möschler, which I secured here last March. The specimen was sent to the U. S. Museum for identification, and Dr. Dyar writes me that it made a welcome addition to their cabinet, and cites Guatemala and the Amazons as its habitat.

J. Wm. Cockle, Kaslo, B. C.

DESCRIPTIONS OF SOME NEW SPECIES OF TABANIDÆ.

BY C. P. WHITNEY, MILFORD, N. H.

Chrysops lupus, n. sp.— ♀.—Length, 8–9 mm. Face shining yellowish ferruginous, callosities outside of suture, and cheeks black. Antennæ black, base of first joint fulvous. Front grayish pollinose, callosity black. Thorax black, with the usual glaucous stripes. Scutellum black. Abdomen yellow, first segment with a black spot wider anteriorly, and connecting on second segment with a subquadrate spot deeply emarginate posteriorly, which does not attain the posterior margin of the segment. The following segments have four large triangular black spots anteriorly, well separated from the posterior margins, and forming serrate bands on the fifth and sixth segments. Venter yellow, with transverse black spots increasing posteriorly. Legs black; front coxæ, middle femora and tibiæ, distal half of posterior femora, posterior tibiæ and base of tarsi ferruginous.

Wings: root, costal cell, crossband and apical spot brown; first basal cell more than one-half infuscated, second at extreme base only. The crossband reaches the posterior margin only as a brown cloud on the last section of the fifth vein. The apical spot is broad in the distal end of the first submarginal cell and occupies as a brown shade about one-third of the apical part of the second submarginal, being almost disconnected from the crossband by the hyaline triangle which crosses the second longitudinal vein.

Hab.: Grand Lake, Col. Nine females collected by Mr. G. M. Dodge in August. Long's Peak, two females, Mr. E. A. Dodge, July.

The wing picture most resembles *hilaris*, O. S., of any eastern species, though the first basal cell is farther infuscated. The abdominal markings are somewhat like *callidus*, O. S., but the spot on second segment is shaped more as on *indus*, O. S.

Chrysops Pikei, n. sp.— ♀. Length, 6–8 mm. Face yellow, the callosities infuscated outwardly. Antennæ slim, first joint yellow, second a little infuscated, the third blackish brown. Front yellow, with black callosity and ocellar space. Thorax black, with wide, well-defined stripes of greenish-yellow. Abdomen yellow, with two broad black median stripes the entire length, and two narrow abbreviated lateral stripes beginning on the third segment. The sixth segment is mostly black. Venter yellow, with slender furcate lateral lines and an abbreviated wider median stripe black. Legs yellow; distal part of anterior tibiæ, anterior and posterior tarsi infuscated.

July, 1904.

Wings: first basal cell completely infuscated, except a small apical hyaline spot contiguous to a basal one in the discal cell. The second basal cell is hyaline, except a slight proximal infuscation. The crossband reaches the hind margin, completely filling the fourth posterior cell. The fifth posterior cell is entirely hyaline, except for a slight but distinct cloud near the tip of the fifth vein, and which occasionally extends up the vein as a very faint shade. The hyaline triangle seldom reaches the second longitudinal vein and is broad and blunt at its extremity. The apical spot nearly fills the second submarginal cell and crosses the first posterior at its extremity.

Eleven females, collected by Mr. G. M. Dodge in Pike Co., Mo. One specimen has the front and dorsum of thorax dense black.

This species resembles *sequax*, Will., but the latter has the hyaline triangle narrower, arcuated, owing to the convex distal margin of the crossband, and it crosses the second vein.

Tabanus benedictus, n. sp.— ♀. Length, 23–25 mm. Palpi slender, dark brown with appressed black hairs. Two basal joints of antennæ dark brown, third joint fulvous, the angle prominent. Eyes revived by moisture, purple, with two green bands. Front narrow, distinctly contracted anteriorly, dark brown; callus brown, twice as long as wide, with a fusiform prolongation above. Subcallus and face covered with dense yellow pollen. Thorax dark reddish-brown with a faint whitish median line. Abdomen black, pruinose. Legs black, base of tibiæ dark reddish. Wings fuliginous; base, costal cell and stigma fulvous, brown clouds upon cross-veins and divarication of third vein. First posterior cell closed or nearly so.

Five females, Mr. G. M. Dodge, Pike Co., Mo., August.

This species may be easily recognized by its peculiar abdomen, which resembles that of *atratus*, F., its narrow front and closed first posterior cell.

Tabanus (Thevioplectes) typhus, n. sp.— ♀. Length, 11–13 mm. Palpi yellow, long and tapering, with white and black hairs. Face and cheeks grayish, covered with white pollen and long white hairs. Antennæ fulvous; first two joints with black hairs, third joint with upper angle obtuse, the concave upper margin sometimes infuscated, the annular tip black. Eyes purple, with the green bands common to the subgenus. Front broad, whitish-gray, slightly contracted anteriorly, callus castaneous,

a darker lanceolate spot above, subcallus covered with white pollen. Thorax olive black, with three lighter lines, antealar tubercle rufous with black hairs. Abdomen rufous with a broad median black stripe broken by the white posterior margins of the segments. There are lateral rows of large, angular whitish spots with whitish hairs, resting on the posterior margins of the segments. Commencing on the second or third segment near the lateral margin are blackish spots, increasing posteriorly. The whitish margins expand medially into a row of very small triangles. Venter rufous, darker posteriorly with white margins. Legs fulvous, base of femora and tips of tibiæ infuscated, tarsi black. Wings hyaline; stigma, costal cell and base luteous.

Six females, Milford, N. H., July.

This species is the size of *astutus*, O. S., but the latter has darker antennæ, the frontal callosity black, a more perceptible cloud on the divarication of the third vein, and the median row of abdominal spots much larger. The abdomen appears more tapering and the rufous tinge is wanting.

A NEW ICHNEUMON.

BY REV. THOMAS W. FYLES, LEVIS, QUEBEC.

Amesolytus pictus, n. sp.—Length of body, 8 mm.; length of antennæ, 4 mm.; expanse of wings, 13 mm.

Head: Clypeus white, pilose, somewhat mottled in appearance; mouth organs white; upper portions of the head black, except that on either side of the front there is a white line next the eye, and above the eye on either side a white semi-oval patch extending behind the ocelli. Eyes oval, large, protuberant, dark brown with a gloss. Ocelli jet black. Cheek, lower part white; upper part black. Antennæ: scape bead-like, jet black above, white beneath; pedicel jet black; flagellum 30-jointed, fuscous. Thorax: pronotum and upper parts black, set thickly with retrorse white hairs. On either side is a white line curving and widening above the first pair of legs, and then extending upward to the tegulæ. Scutellum rather small, outlined with white; upper and lower edges slightly curved; sides somewhat indented. Post-scutellum has a short white line in the middle of the outer edge. Metathorax elongate, truncated behind. Under parts of thorax light red. Fore wings: costal nervure edged with setæ, basal nervure boldly curved, first transverse cubital nervure short and straight, second ditto wanting; submedian cell larger than the

median. Hind wings: costal cell of good size, cubital cell large; the transverse cubital nervure set well back, making the median cell to end with an angle. Legs: first pair small, third pair much larger than either the first or the second; coxæ and trochanters light red; femora light red with pale yellow patches at the knees, the last pair much enlarged and curved like a bill-hook; tibiæ white, very hairy; in the second pair of legs the tibiæ have a black patch at the bottom, and in the third pair a black patch both at top and bottom; tibial spur large and white; tarsi white, hairy, the lower half of last joint and claws black. Abdomen: Attached to thorax by a short petiole slightly curving upward, clavate, 7-jointed, entirely black, punctured and pubescent.

Fig. 7.

I raised this very beautiful insect (Fig. 7, greatly enlarged) last year from *Meroptera pravella*, Grote, a leaf-crumpler on the Sumach. Dr. Ashmead says of it: "*Amesolytus*, n. sp.—Quite different from the other species described in our fauna, which comes from Texas." I have deposited a type of the species in the National Museum at Washington.

A REVIEW OF OUR GEOMETRID CLASSIFICATION.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

Since any work in this group must of necessity be a review of that done by the late Dr. Geo. D. Hulst, I want to state in this beginning of mine, that it is not to be regarded as a criticism.

Dr. Hulst made (for him) some curious errors, which will be noted later on, but the immense work he did in untangling the synonymy of this variable group, and in his two trips across the ocean to study the types, cannot be overestimated, and by it mine is rendered easy.

Not long since I made an attempt to rearrange my collection of Geometridæ in accordance with Dr. Hulst's classification of the group as given in Trans. Amer. Ent. Soc., Vol. 23, 1896, which was accepted as an authority, and followed without many changes by Dr. Dyar in his recent "List." Dr. Hulst divides the group into two great families, Geometrinæ and Ennominæ, based upon the development or absence of vein 5 in the

hind wings. This leads to a natural division of the specific groups, and is a good starting point. The Geometrinæ he divides into eight subfamilies. One of these, Leuculinæ, Dr. Hulst doubtfully classes as geometrid, and subsequently it proved to belong to the Liparidæ. The Brephinæ are in Dr. Dyar's " List " now placed as a subfamily at the end of the series of Ennominæ. This cannot stand, since vein 5 is developed in all specimens of Brephos I have examined, and it must go, therefore, among the Geometrinæ, or be raised to family rank, as has been done in the case of another subfamily, the Strophidiinæ, now Epiplemidæ. I understand from Dr. Dyar that the manuscript for his list was prepared by Dr. Hulst, and unless the reasons for these changes are there given, I am not aware that they are to be found.

The subfamily Dyspteridinæ is founded upon the absence of the frenulum in certain species. This division is not warranted by the studies which I have made of Dr. Hulst's collection, now lodged in Rutger's College, New Brunswick, N. J., to which, through the courtesy of Prof. John B. Smith, I was granted free access, and of the collection which he gave to the Brooklyn Institute of Arts and Sciences, as well as my own material. Examination of the types of each genus show the following results as to the presence or absence of the frenulum in both sexes :

	Male.	Female.
Dyspteris..... ..	absent.	absent.
Cysteopteryx.....	not a valid genus.	
Nyctobia.	present.	a tuft of stiff hairs.
Cladara	absent.	absent.
Opheroptera	present.	wings aborted.
Paraptera	present.	" "
Rachela.....	present.	" "

Such a showing should, in my opinion, eliminate this subfamily, whose affiliations are with the Hydriomeninæ, and necessitate a reorganization of the latter subfamily, which constructive work I intend to take up later on, after making a comparison of every generic type, with its description. That these descriptions contain many errors, I have already discovered. How far they may affect the general scheme of arrangement, as followed by Dr. Hulst, it is impossible to say as yet, but his arrangement of the species commends itself to me, after some study of the related forms, and it may not be necessary to greatly alter it. I sincerely hope this may be so, because I appreciate the labour bestowed upon this group by Dr. Hulst, when it was in a chaotic condition.

strongly inwardly oblique to inner margin, parallel to direction of t. a., but not so much curved. Inner edge rigid, cleanly marked, outer shading gradually into ground colour. The s. t. line is only marked by a very slight difference in shade between terminal and subterminal spaces, the latter being slightly darker next the line. Fringe concolorous, slightly paler at base. No trace of ordinary spots. Secondaries fuscous, darker outwardly. Mesial band and discal dot evident, but very faint. Female as male, only hind wings somewhat darker. Beneath, fore wings fuscous, with extremely faint, if any, trace of mesial band and discal dot; hind wings paler, with band and dot only a trifle better defined.

None of the specimens before me are perfectly fresh, and it is probable that when better material is available there will be additional features of maculation to be added to the above description. For instance, a few white scales here and a few black ones there lead me to think that in fresh specimens there would be a marginal row of dark points preceded by white ones.

Types: ♂ and ♀, Kerrville, Texas. From Mr. Lacey.

(To be continued.)

THE SO-CALLED HUMAN FLEA, PULEX IRRITANS, INFESTING THE OPOSSUM, DIDELPHIS VIRGINIANA.

BY F. M. WEBSTER, URBANA, ILL.

While engaged in studying the still enigmatical insect, *Platypsilla castoris*, along Devil's River, Texas, in the spring of 1891, an opossum was treed by the dogs one evening, and shot. The following morning I found the animal, which was a female, and, though herself dead, the young were still alive and in the pouch of the mother. While examining these I observed that the pouch also contained numbers of fleas. Specimens were captured and sent to the Department of Agriculture at Washington, I being at the time employed by the Division of Entomology. It is these specimens, I presume, that were described by Mr. Baker, in CANADIAN ENTOMOLOGIST, Vol. XXVII, p. 67, as *Pulex simulans*. In Proceedings U. S. National Museum, Vol. XXVII, p. 379, Mr. Baker states that the occurrence of this flea, which he here considers a variety of *P. irritans*, is to be looked upon as accidental. This latter statement may, perhaps, be true, but it is well enough to place the circumstances surrounding the capture of the type specimens, and to call attention to the fact that the section of Devil's River where they were taken is not by any means a thickly settled one. While I know, from personal experience at the time, that not all of the fleas were infesting the opossums, their abundance on the individual from which they were taken, and the nature of the country inhabited by her, would lead me to look rather confidently for their recurrence on others of these animals, especially where opossums are, if anything, thicker than humans, and fleas *ad infinitum*.

THE GEOMETRIDÆ IN "THE MOTH BOOK."

BY REV. G. W. TAYLOR, WELLINGTON, B. C.

It seems a little ungracious to call attention to errors in so excellent a work as "The Moth Book," and presumptuous for a novice to criticise so eminent an authority as its author, but perhaps it is as well for the sake of the many amateur collectors who will name their captures from Dr. Holland's beautiful plates that the few mistakes that seem to have crept in should be pointed out.

There are four plates upon which species of Geometridæ are figured, and I think that in a few cases the names attached to the figures ought to be changed.

On Plate XLII., figure 25 represents *Alsophila pometaria*, not *Paleacrita vernata*. Figure 32 on the same plate is *Macaria infimata*, as pointed out by Dr. Dyar in the January number of this journal. I have on several occasions received specimens of *M. infimata* from eastern collectors as *Eupithecia absynthiata*. Figure 49 is *Petrophora fluctuata* not *Mesoleuca intermediata*.

On Plate XLIII., figures 10 and 11 represent *Hydriomena excurvata* = *Ceratodalia Gueneata*, Packard, not *Hydriomena custodiata*, which is the *Ochyria Gueneata*, Packard. Figure 36 seems to be *Deilinia erythremaria* rather than *D. variolaria*, and figure 39 represents the European form *Philobia notata*, and not the western American *P. enotata*.

On Plate XLIV., figure 2 is an excellent portrait of the *Caripeta seductaria* of Strecker, and is not the species figured by Packard in his monograph as *C. angustiorata*, Walker. I possess both species, and they are quite distinct. Figure 32 is, I think, *Plagodis alcoolaria*, not *P. emargataria*.

I may also call attention to the fact that there are some evident misprints in the "Key to the Families," on page 24, which will, I fear, make the use of the key difficult for beginners.

Lastly, I may point out that Dr. Holland does Dr. Dyar an injustice, unintentional of course, when he says on page 344 that he has overlooked in his catalogue the *Cleora atrifasciata* of Hulst, for, as a matter of fact, Dr. Dyar has placed that form just where Dr. Hulst himself (see Ent. News, VI., 43) said it should go, namely, as a synonym of *Mesoleuca immanata*. I must admit that this appears a strange position for a moth described as a *Cleora*, and as Dr. Holland has the type it is interesting to know his opinion of its specific value.

THE GENUS PSILOPUS OF AUTHORS.

BY J. M. ALDRICH, MOSCOW, IDAHO.

In the Journal of the New York Entomological Society, X., 140, 1902, footnote, Mr. Coquillett called attention to a serious error of mine in my revision of what I called the Psilopinæ (Diptera, family Dolichopodidæ), by which I applied the new name Gnamptopsilopus to that portion of the old genus containing the type species *platypterus*. But little investigation was needed to assure me that the criticism was just. This has led to an overhauling of the literature of the group, and I understand now what name ought to be used for Psilopus, which has been for many years to be preoccupied. Some of the papers needed I could not obtain, which delayed my task; but the main difficulty was with the nomenclatorial questions, historical and critical, which rose up as I have never found anything like it in previous excursions into nomenclature. I doubt very much if any two zoologists could independently investigate the subject and come to the same conclusion; at least, there are a number of different names for which plausible arguments can be made. It would require a lengthy article to set forth all the queer questions connected with the case; I dare not attempt it, partly because it would not be worth the room, and partly because it would make subsequent change too easy. Instead of offering a choice of several names, I give my conclusions and a few notes, and particularly request that any future worker in the family who may wish to use other names for the genera will do as I have done—examine all the literature and then ponder the matter one year before making any change.

The two genera which I have formerly called Gnamptopsilopus and Psilopus should stand as follows:

AGONOSOMA.

Guérin-Méneville, Voyage . . . . sur la Corvette; Zoologie, Tome II., partie 2me, p. 293. Paris, 1838 (title page gives date 1830). On the plates the genus is called Chrysosoma.

Fallén, Dolichopodes, 23, 1823 (Leptopus, preoc.).

Meigen, Syst. Beschr. Europ. Zw. Ins., IV., 35, 1824 (Psilopus, preoc.).

Zeller, Isis, 1842, 831 (changes Psilopus to Sciapus).

?Bigot, Annales Soc. Ent., France, 1859, 215 (Margaritostylus, in part).

Rondani, Dipt. Italicæ Prodromus, IV., 11, 1861 (changes Psilopus to Psilopodius).

Schiner, Fauna Austriaca, Dipt., I., 180, 1862 (Psilopus, Meig.).

Loew, Monogr, N. A. Diptera, II., 229, 1864 (id.).

Aldrich, Kans. Univ. Quart., II., 47, 1893 (Gnamptopsilopus); Biologia Cent. Amer., Dipt., Suppl., 364, 1902, table of species (id.).

Coquillett, Jour. N. Y. Ent. Soc., X., 140, 1902, synonymy of Gnamptopsilopus.

Bezzi, Zeitsch f. Hym. u. Dipterologie, 1902, 191, adopts Sciapus.

PSILOPODINUS.

Bigot, Annales Soc. Ent., France, 1890, 269.

?Bigot, Annales Soc. Ent., France, 1859, 215 (Oariostylus, Megistostylus, Mesoblepharius, Condylostylus, Eurostomerus, Dasypsilopus, Heteropsilopus, Aedipsilopus).

?Bigot, Annales Soc. Ent., France, 1890, 261–269 (Spathipsilopus, Eudasypus, Amblypsilopus, Tylochætus, Oariopherus).

Aldrich, Kans. Univ. Quart., II., 47, 1893 (Psilopus in restricted sense).

NOTES.—I have seen all the literature cited except Zeller. The Smithsonian Institution kindly loaned me Guérin-Méneville.

The genera of Bigot, published in 1859 and 1890, are very badly conceived, and not properly genera at all, nor even subgenera. The descriptions of the type species hardly allow a definite opinion as to their location in the two genera here adopted, but I incline to place most of them in the second genus, with tegular cilia black. I chose to retain Bigot's name Psilopodinus for this genus for several reasons. First, *sipho* is mentioned among the types; second, it is not based on purely sexual characters (nor on much of anything else, I must admit); third, it is an advantage to retain this name from its resemblance to Psilopus, as the group includes Loew's larger section of Psilopus, and all that I referred to that genus in my revision.

The genus Agonosoma was supposed by its describer to differ from Psilopus by a more elongated third antennal joint and a somewhat different structure of the face and front. Two East Indian species were described, *fasciata* and *maculipennis*. In these the antennæ are yellow or ferrugineous, with tip of third joint infuscated. The figure of the wing of the first shows the third vein parallel at the tip with the fourth. These two characters are quite distinctive, and I think we may safely assume that the species also have pale tegular cilia, and are entirely congeneric with *Psilopus platypterus*, which should, therefore, be referred to Agonosoma.

The effect on nomenclature is as follows: In Loew's Monograph of N. A. Dolichopodidæ, p. 244, his first section of Psilopus, comprising those with black cilia of the tegulæ, are now referred to Psilopodinus, excepting *Psilopus dimidiatus;* the other section, with pale cilia, are now referred to Agonosoma, together with *Ps. dimidiatus*. In Williston's Manual of N. A. Diptera, 1896, pp. 77, 78, substitute Psilopodinus for Psilopus, and Agonosoma for Gnamptopsilopus.

SOME ORTHOPTERA TAKEN AT MOOSE JAW, ASSINIBOIA.

BY A. N. CAUDELL, WASHINGTON, D. C.

Last summer, on August 24th, a few hours were spent at Moose Jaw collecting Orthoptera. But few species were taken, and they are here listed for the locality. They were all taken on the open prairie, out a short distance from the town.

Chortophaga viridifasciata, DeGeer. Nymphs only taken.

Phlibostroma quadrimaculatum, Thom. But a few specimens taken.

Gomphocerus clepsydra, Scudd. This species was moderately common.

Arphia pseudonietana, Thom. (*tenebrosa*, Scudd.). Rather common, but not numerous.

Mestobregma kiowa, Thom. A single male taken.

Encoptolophus parvus, Scudd. One female specimen only taken. This species does not appear to have been previously reported from Canada.

Melanoplus atlanis, Riley. Apparently not very common.

Melanoplus Dawsoni, Scudd. Only the short-winged variety, *tellustris*, was taken. It occurred quite abundantly in the prairie grass.

Melanoplus infantilis, Scudd. This was the most numerous of any species noted.

Gryllus Pennsylvanicus, var. *neglectus*, Scudd. Five specimens of this insect were taken under a stone in a draw, or small hollow, on the prairie. Scudder has referred this insect to the synonymy, placing it as a synonym of Burmeister's *G. Pennsylvanicus*, but the smaller size and shorter elytra certainly entitle it to varietal distinction.

Nemobius fasciatus, var. *abortivus*, n. var. Hopping actively about in the grass in and along the borders of the above-mentioned draw were numbers of a small *Nemobius*, which is very similar to *N. fasciatus*, but is uniformly darker, being nearly black, and decidedly smaller, as shown by the following measurements :

Length elytra, male 4.5 to 6 mm., female 3 to 4 mm.; posterior femora, male 4 to 5 mm., female 5 to 6 mm.; ovipositor, female 6 to 7 mm.

About three dozen specimens, a few more females than males, were taken, and they are very uniform in size and coloration. This is the small black species mentioned by Walker, on page 184 of the CANADIAN ENTOMOLOGIST for July. Specimens were submitted to Prof. Blatchley, who says they may eventually prove a good species. They certainly form a valid variety, which may be called *abortivus*. Like *vittatus*, it is short-winged. Except for the uniform black colour, it resembles the *N. Utahensis* of Scudder.

Mailed August 3rd, 1904.

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REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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The Canadian Entomologist.

VOL. XXXVI. LONDON, SEPTEMBER, 1904. No. 9

THE CRICKETS OF ONTARIO.

BY E. M. WALKER, B. A., M. B., TORONTO.

(Continued from page 188.)

Genus GRYLLUS.

This genus contains the common large black field crickets and the house cricket, which has been introduced into this country from the Old World. But three species have been taken in Ontario. All of these are dimorphic as regards wing-length, the short-winged form being the normal one in the field crickets, the long-winged form in the house cricket.

Key to the Ontario species of *Gryllus*:

a. Black species, the tegmina and parts of the body sometimes dull reddish-brown; first joint of antennæ not projecting beyond front of head. (Field crickets.)

b. Ovipositor nearly or fully half as long again as hind femora, usually exceeding 16 mm. in length; the male stout, with large and broad head.....9. *abbreviatus.*

bb. Ovipositor seldom if ever more than 14 mm. or less than 12 mm., rarely more than one-fourth as long again as hind femora; the male more slender with narrower and less swollen head .....10. *pennsylvanicus.*

aa. Straw-coloured species with some dark brown or blackish markings on head and thorax; first joint of antennæ projecting slightly beyond front of head. (House crickets).....11. *domesticus.*

9. GRYLLUS ABBREVIATUS, Serville. The Common Field Cricket.

Gryllus abbreviatus, Serv., Hist. Nat. des Ins., 1839, 336.

Acheta abbreviata, Harr., Ins. Inj. to Veg., 1862, 152.

Gryllus luctuosus, Serv., Hist. Nat. des Ins., 1839, 335.

Gryllus angustus, Scudd., Journ. Bost. Soc. Nat. Hist., VII., 1862, 427.

This is the common field cricket with which everyone is familiar. It varies greatly in size in Ontario, according to locality, southern specimens averaging much larger than northern ones. The measurements given in the published descriptions of this species are too large for average

specimens from Ontario. Specimens from Point Pelee measure about the same as those from Indiana, according to Blatchley's figures, but those from Toronto, Lake Simcoe and other places further north are distinctly smaller, the smallest average size being found in the North Bay and Northern Muskoka specimens. My smallest specimens are from Lake Simcoe, but I have many from this locality that are nearly as large as those from Point Pelee, and there is a complete series of intermediate sizes. The smaller specimens are sometimes very difficult to distinguish from *G. pennsylvanicus*, especially the males, in which the head is not always broader and more swollen than in that species. In the females the ratio of the length of the hind femora to that of the ovipositor is pretty constant.

The following are measurements of average specimens from the localities given:

	Point Pelee.	Lake Simcoe.	Goderich.	Dwight.	North Bay.
Pronotum....	mm. ♂ 4 ♀ 4.3	mm. ♂ 3.5 ♀ 4	mm. ♂ 3.5 ♀ 3.7	mm. ♀ 3.3	mm. ♂ 3.3 ♀ 3.5
Hind Femur..	mm. ♂ 13 ♀ 13.5	mm. ♂ 13 ♀ 13.5	mm. ♂ 11 ♀ 11.3	mm. ♀ 10.5	mm. ♂ 9.7 ♀ 10.5
Body.....	mm. ♂ 20 ♀ 21	mm. ♂ 18 ♀ 18.5	mm. ♂ 19.5 ♀ 18.5	mm. ♀ 15	mm. ♂ 16 ♀ 17.5
Ovipositor ...	19.5 mm.	18 mm.	17.5 mm.	15 mm.	15.5 mm.

Adults begin to appear about the second week in August. My earliest captures are from Point Pelee, Aug. 7, 1901, where I found them fairly numerous under boards and rubbish on the sand. These specimens are all of large size, the ovipositor sometimes more than 20 mm. in length. In September and October they become very numerous and congregate in large numbers under every chunk, log or board, under the loose bark of old stumps, or in burrows in the sand. Late in the season they may be seen in hundreds sunning themselves on fences close to the ground. The eggs are laid in October, and, according to McNeill, in Northern Illinois, hatch in the following July. None of the adults ever survive the winter, the crickets which appear in the spring belonging to another species.

For interesting accounts of the life-history and habits of this insect the reader is referred to McNeill's "List of the Orthoptera of Illinois," in Psyche, VI., 1891, p. 5, and to Blatchley's "Orthoptera of Indiana," p. 436.

Long-winged females of *abbreviatus* are common in Ontario, though far less so than the short-winged individuals. On Aug. 26, 1901, I found considerable numbers of them floating on Lake Huron, off the shore of the Bruce Peninsula. I have never seen a long-winged male.

Localities: Pt. Pelee, Aug. 7, 1901; Arner, Aug. 9, 1901; Rondeau, Sept. 14, 1899; Sarnia, Aug. 15, 1901; Goderich, Aug. 19, 1901; Southampton, Aug. 20, 1901; Bruce Peninsula, Aug. 25–26, 1901; Owen Sound, Aug. 31, 1901; Peterborough Co., Sept., 1903; Toronto, Aug.–Nov.; Lake Simcoe, Aug.–Oct.; Dwight, Muskoka, Aug. 23, 1903; Algonquin Park, Aug., 1902–3; North Bay, Sept. 12, 1900.

10. GRYLLUS PENNSYLVANICUS, Burmeister. The Pennsylvania Field Cricket.

Gryllus pennsylvanicus, Burm., Handb. der Ent., II., 1838, 734.

Gryllus luctuosus, McNeill, Psyche, VI., 1891, 4.

Acheta niger, Harr., Ins. inj. to Veg., 1862, 152.

Gryllus neglectus, Scudd., Journ. Bost. Soc. Nat. Hist., VII., 1862, 428.

Measurements: Length of pronotum, ♂ 3 mm., ♀ 3.3 mm.; of hind femur, ♂ 10 mm., ♀ 10.5 mm.; of body, ♂ ♀ 17.5 mm.; of ovipositor, 13.5 mm.

I have often found mymphs of this species in early spring under logs and rubbish, where they have passed the winter. The chirp of the adult is first heard about the third week in May, the last toward the end of July. They are most numerous about midsummer, when the fields and pastures resound with their song. They are very difficult to obtain, however, for they are not gregarious like *G. abbreviatus*, but usually occur in pairs hidden in the rubbish under some thick tuft of grass or weeds, or under the edge of a stone. It requires the utmost care and patience to trace the song to its source, but if this is done successfully, one is often rewarded by finding the female as well as the male.

They are found everywhere in open woods and pastures, and are most abundant on sandy soil.

Blatchley says of this species in Indiana, that "the young hatch in July and August, and after the second or third moult form their winter abiding places, while the adults perish with the coming of the hoarfrost."

It has always appeared to me that the adults disappear long before the summer is over, but this may be an error on my part. The chirping of the males becomes more and more infrequent towards the close of July, and apparently disappears before that of *abbreviatus* begins. None of my female specimens of Gryllus taken after July can be referred to *pennsylvanicus*, though some of the males, I confess, I should be unable to place were it not for their dates.

I have only one long-winged female taken at De Grassi Pt., Lake Simcoe, which has, unfortunately, no date attached.

Localities Niagara Glen, June 28, 1903; Hamilton, June, 1893; Toronto, May 23, 1898, June; Lake Simcoe, June–July 30, 1901.

11. GRYLLUS DOMESTICUS, Linnaeus. The House Cricket.

Gryllus (Acheta) domesticus, Linnaeus, Syst. Nat. I., 1758, 428.

Gryllus domesticus, Glov., Illust. N. A. Ent., 1872, Pl. VI., fig. 14.

Measurements: Length of pronotum, ♂ ♀ 3 mm.; of hind femur, ♂ 10.5 mm., ♀ 10 mm.; of body, ♂ 20 mm., ♀ 18 mm.; of ovipositor, 11 mm.

Late in the fall of 1903 I heard the chirp of a cricket in the basement of the Toronto General Hospital, but paid little heed to it, thinking it was that of a common field cricket which had entered the building. My attention was again drawn to the sound, however, as it persisted night after night, and I began to notice that it was higher pitched and of less volume than that of the field cricket. I traced the sound to the boiler-room and found, as I had expected, the European house cricket, which I had never before met with in this country. They were there in plenty, lurking in the chinks between the bricks of the wall, and positively swarmed under some loose bricks close to the furnace. They were found in all stages, most of them nearly matured. Imagoes continued to be found throughout the winter, but became scarcer in early spring, and by May had nearly disappeared.

I took one short-winged female. The rest were all long-winged.

The house cricket is said to be found also in the Trinity College building. Both this and the General Hospital are comparatively old buildings.

It has been reported once before from Toronto by Caulfield. (Ann. Rep. Ent. Soc. Ont., XVIII., 1888, 69.)

Sub-family ŒCANTHINÆ.

We have one genus, *Œcanthus*, the species of which are slender, delicate insects of pale greenish or whitish colours, living on trees, shrubs or tall herbs. The males differ considerably from the females in appearance, on account of the great width of the tegmina, which are much broader than the body, while those of the female are narrow and fit closely around the abdomen.

Only three species have been found in Ontario, but there are doubtless others in the south-western part of the Province.

Key to the Ontario species of *Œcanthus*:

a. Antennæ with but one black mark on each of the two basal joints, black marks in the form of small rounded dots.....12. *niveus*.

aa. Antennæ either wholly black or with two black marks on each of the two basal joints.

b. Head and thorax either black or trifasciate with black or fuscous; antennæ usually black, when pale the marks on the first joint generally connected at apex.. .....13. *fasciatus*.

bb. Wholly pale greenish or yellowish, translucent; marks on the antennæ elongate, parallel, distinct.....14. *quadripunctatus*.

12. ŒCANTHUS NIVEUS, De Geer. The Snowy Tree Cricket.

Gryllus niveus, De G., Mem. pour serv. à l'hist des Ins., III., 1773, 522.

Œcanthus niveus, Fitch., Trans. N. Y. State Agric. Soc., XVI., 1856, 404.

Measurements: Length of body, ♂ 10.5 mm., ♀ 11 mm.; of tegmen, ♂ 13.3 mm., ♀ 12.3 mm.; of hind femur, ♂ ♀ 8 mm.; of ovipositor, 4.6 mm.; width of ♂ tegmen, 5.25 mm.

This well-known insect is very common in the cultivated parts of Ontario, where it frequents orchards, vines and shade trees. Its song is the soft rhythmical "treat, treat, treat," which can be heard any evening in late summer or autumn. It is also heard in the day-time in cloudy weather, but at such times is much more subdued.

Of native trees I have found it most partial to butternut, but it occurs on many others. At De Grassi Point, Lake Simcoe, I have often traced the song to the tree from which it came, and it was very often a butternut, but sometimes an elm, maple or other hard wood.

The females are often found on the trunk and lower branches, and are comparatively easily taken, but the males are usually higher up and are quite difficult to obtain.

Niveus is generally held responsible for a great deal of mischief done to raspberry and blackberry canes by the females in laying their eggs. It is my belief that most of this damage, at least in this locality, is caused by the other two species of *Œcanthus*, which abound on raspberry bushes, while *niveus* is seldom, if ever, found upon them. *Niveus* comes to maturity about the first week in August and continues till late in October.

Localities: Leamington, Aug. 7, 1901; Arner, Aug. 9, 1901; Chatham, Aug. 10, 1901; Sarnia, Aug. 12, 1901; Goderich, Aug. 19, 1901; Toronto, Aug.–Oct. 13; Lake Simcoe, Sept. 6–21, 1901.

13. ŒCANTHUS FASCIATUS, Fitch. The Striped Tree Cricket.

Œcanthus fasciatus, Fitch., Trans. N. Y. State Agric. Soc., XVI., 1856, 414.

Œcanthus nigricornis, Walk., Cat. Derm. Salt. Brit. Mus., I., 1869, 93.

Measurements: Length of body, ♂ ♀ 12 mm.; of tegmen, ♂ 11 mm., ♀ 12 mm.; of hind femur, ♂ ♀ 8 mm.; of ovipositor, 5.5 mm.; width of ♂ tegmen, 4.8 mm.

This is by far the commonest tree cricket in Ontario, and during August and September it abounds on shrubs and tall herbs, especially golden-rod, and is particularly plentiful on low grounds. Partially cleared bush lands supporting a rank growth of raspberry bushes, golden-rod, boneset and other tall herbaceous plants are favorite haunts. It is so common on raspberry bushes that there is little doubt that the female is responsible for much damage to the canes, though I have no proof of this assumption. I have found it in cultivated raspberry bushes in gardens, but it is more partial to wild districts.

In shrilling the male elevates the tegmina to nearly a right angle with the body and spreads them to an angle of about 45°. The song is a continuous and rather powerful trill, and is kept up all night and in cloudy weather during the day when the sun is shining. It begins about mid-afternoon.

Localities: Chatham, Aug. 10, 1901; Sarnia, Aug. 12, 1901; Walpole Id., River St. Clair, Aug. 13, 1901; Toronto, Aug.–Sept.; Lake Simcoe, Aug.–Sept.; Goderich, Aug. 19, 1901; Burke Id., Lake Huron, Aug. 27, 1901; Bruce Peninsula, Aug. 23, 24, 1901; Algonquin Park, Aug. 23, 1902; North Bay, Sept. 12, 1900.

14. *Œcanthus quadripunctatus.* The Four-spotted Tree Cricket.

Œcanthus quadripunctatus, Beut., Bull. Amer. Mus. Nat. Hist., VI., 1894, 250.

Œcanthus fasciatus, Hart., Ent. News, III., 1892, 33 (text in part).

Measurements: Length of body, ♂ 9.5 mm., ♀ 11.5 mm.; of tegmen, ♂ 11 mm., ♀ 12 mm.; of hind femur, ♂ 7 mm., ♀ 7.5 mm.; of ovipositor, 5 mm.; width of ♂ tegmen, 4.5 mm.

I believe this form to be merely a pale variety of *Œ. fasciatus*, as I have a series of intergrades and am unable to draw a definite line to separate the two. I have retained the name *quadripunctatus* for the present, however, as I have an insufficient series of typical examples of this form to make a satisfactory comparison between the two varieties.

Quadripunctatus is common in the southern part of the Province, where it is associated with *fasciatus*, but I have never taken typical specimens in the north. Blatchley found it abundant on the north shore of the Niagara River, opposite Buffalo, N. Y.

Localities: Chatham, Aug. 10, 1901; Walpole Id., River St. Clair, Aug. 13, 1901; Toronto, September.

A NEW GENUS AND SPECIES BELONGING TO THE GEOMETRIDÆ.

BY GEO. W. TAYLOR, WELLINGTON, B. C.

The Geometrid moth described below cannot be placed in any European or American genus known to me, and I therefore venture to institute a new genus for its reception.

The genus belongs to the *Ennominæ*, and the absence of a tongue and the possession of the dorsal abdominal tufts serve to separate it readily from all the other American genera of the subfamily, as none of them, I believe, possess these two characters in combination.

As there is some difficulty, especially for a novice, in finding a suitable combination of Greek or Latin which has not already been used as a generic name in some branch of Zoology, I have named this genus after the island opposite to Nanaimo, V. I., where I took specimens of the species last summer. The species I dedicate to my friend Dr. Dyar, who has given me much help and encouragement since I began my study of the Geometridæ.

Gabriola, n. g.—Palpi short, subascending: tongue apparently wanting; front scaled; antennæ ♂ heavily pectinated, pectinations rapidly shortening and leaving apex simple; thorax tufted posteriorly,

loosely scaled; abdomen with dorsal tufts on second, third and fourth segments, the tuft on segment three being the most conspicuous; hind tibiæ of ♂ slightly swollen, with all spurs; fore wings with 12 veins, 5 weak, 10 and 11 from cell; hind wings with all veins separate, 5 undeveloped, 8 separate from cell.

Type: G. Dyari.

Gabriola Dyari, n. sp.—Male expands 25 mm. Front, thorax and abdomen gray, with numerous black scales. Thoracic and abdominal tufts tipped with black, a black band on front of thorax and the posterior margins of the abdominal segments are also marked with black scales. Fore wings a warm shade of brown with two very distinct black lines—intra and extra discal. The intra discal line is regularly curved, commencing on the costa at about one-fourth the distance from base to apex, and terminating on inner margin at a little greater distance from base. Extra discal line also very distinct, leaving costa at about two-thirds distance from base to apex, running in a straight line towards central point of hind margin. At vein 5 it turns at right angles and runs in an almost straight line to juncture of veins 3 and 4, thence in a bold inward curve to vein 1, and thence curving in the opposite direction to inner margin. There is an indistinct gray cloud in the middle of the basal area with some scattered black scales. The central area is uniformly brown, peppered with darker scales; no discal dots apparent; outer area brown, with a blackish cloud bordering the extra discal line and becoming a decided blotch on the inner margin. This black cloud is bounded outwardly by a white line, distinct on the costa, then almost obsolete, but reappearing very distinctly below vein 4 and widening, in some specimens, into a large and conspicuous white spot at the inner angle; a marginal row of intervenular black dots. Hind wings paler, with a broad subterminal black shade and an irregular black line across the centre of the wing.

Beneath: the markings of the fore wings are faintly reproduced, but the intra discal line is almost obsolete, and the extra discal, instead of having the double curve as on the upper side, runs in an almost straight line from vein 5 to the inner margin. The lines on the hind wings are also reproduced, the median line being much more distinct than on the upper side, and the subterminal line is broken up into 3 or 4 blotches.

Described from 4 ♂ specimens in my own collection, which were taken in August, 1903. I have seen numerous other specimens, all males, in British Columbian collections, and there are specimens also in the United States National Museum. I have not seen the ♀. The species seems to be not uncommon on Vancouver Island.

THE DIPTERA OF BRITISH COLUMBIA.

Second Part.—The Syrphidæ.

BY RAYMOND C. OSBURN, NEW YORK.

(Continued from page 220.)

43. *Sphærophoria micrura,* Osten Sacken.—Two females from Port Renfrew, one July 6, 1901, the other Aug. 16, 1902. The male was taken at Seattle, Wash., July 15, 1901.

44. *Sphærophoria sulphuripes* (Thompson).—One male specimen, taken at Glacier, July 20, 1901, belongs here questionably. It lacks the characteristic bunch of yellow pile on the hypopygium of *cylindrica*, but otherwise resembles that species quite closely.

45. *Sphærophoria melanosa*, Williston.—A single specimen taken by Harvey at Vancouver, May 30, 1903, agrees quite well with Williston's description, except that the cheeks are brownish instead of shining black.

46. *Sphegina infuscata,* Loew.—Not common. Port Renfrew, July 6, 1901. A specimen from Mr. Harvey, Vancouver, April 12, 1902. Taken at Lowe Inlet by Kincaid, June 3 (Coquillett, 1900). The writer has taken the species also at Laggan, Alberta, Aug. 23, 1902. Two other specimens taken by Harvey, one at Vancouver, March 28, 1903, and one at Wellington, I place here provisionally. They are much larger and darker than the typical form, and may be distinct.

47. *Sphegina lobata*, Loew.—Not common. Port Renfrew, July 3, 1901; Glacier, Aug. 20, 1902. These show no difference from Ohio specimens.

48. *Baccha obscuricornis*, Loew.—A single specimen from Port Renfrew, July, 1901; one specimen from Harvey, Vancouver, May 30, 1903. Taken at Lowe Inlet by Kincaid, June 3 (Coquillett, 1900). A single specimen was taken also by the writer at Seattle, July 15, 1901.

49. *Myiolepta bella*, Williston. A single specimen of this fine species taken at Port Renfrew, June 30, 1901.

50. *Volucella facialis*, Williston.—Taken by Harvey at Vancouver, May 17, 1902, and May 30, 1903. The writer has taken the species at Banff, Alberta, July 17, 1902.

51. *Pyritis montigena*, Hunter.—Taken by Harvey at Vancouver, May 2, 1903, and again at Vernon. A number of specimens, only females. A specimen is in my collection from Victoria also. The species was described in 1895 from a single male specimen taken at Moscow, Idaho. As the female has not, to my knowledge, been described, I indicate here the characters.

Very similar to the male, differing only in the following: Eyes widely separated. Front broadly sulcate transversely, below the sulcus shining; in the sulcus and above brownish pollinose. Face above and on the sides also brownish pollinose. The whole body, head and legs covered with whitish or light yellowish pile; the only black hairs present are those on the eyes and aristæ.

I have not been able to compare with the male of this species, but the female answers so well to the description that I have little hesitation in describing it here.

52. *Pyritis Kincaidii* (Coquillett)—(*Volucella Kincaidii*, Coquillett, Ent. News, 1895, pp. 131–2.)

Taken by Harvey at Vancouver, Feb. 14, 1901; Feb. 28, 1903; April 12, 1902; also at Vernon, May 2, 1903. Four specimens, two males and two females.

This species is quite close to the preceding. I have been unable to separate them by any marked anatomical characters, and yet they are quite different in appearance. *P. Kincaidii* averages larger than *P. montigena*, yet they intergrade in size. The chief difference to be noted is in the colour of the pile, which in *montigena* is whitish or light yellowish, while in *Kincaidii* it is dark reddish yellow. The females of *Kincaidii* are exactly like the males in this respect, and, in my specimens, show no tendency to intergrade in colour with *P. montigena*.

53. *Sericomyia chalcopyga*, Loew.—A common species at Port Renfrew, on dates ranging from June 30 to Aug. 16. Mr. Harvey has taken the species at Vancouver, April 12 and Oct. 3, and at Wellington, April 17. The writer has taken the species also at Laggan, Alberta, Aug. 24, 1902.

(*Sericomyia militaris*, Walker. Taken at Laggan, Alberta, Aug. 24, 1902, and will undoubtedly be found in Br. Col.)

54. *Arctophila flagrans*, Osten Sacken.—Port Renfrew, Aug. 10, 1902; Glacier, Aug. 20, 1902. A single male specimen taken at each

locality. Snow says (Kan. Univ. Quart., 1895, p. 242): "So far as I know this species is taken only on the summits of mountains of considerable height." My specimen from Port Renfrew was taken on low ground by the sea shore. The species has not previously been recorded so far north, and perhaps this is only another example of the law that mountain species approach the sea level in higher latitudes.

55. *Eristalis tenax* (Linné).—Abundant everywhere. Taken all summer. Port Renfrew, Victoria, Vancouver, and also at Seattle, Wash. Specimens have also been received from Vancouver, Victoria and Wellington, from Mr. Harvey.

56. *Eristalis latifrons*, Loew.—Victoria, July 17, 1901. Taken also at Banff, Alberta, June 17, 1901.

57. *Eristalis montanus*, Williston.—A single specimen, female, taken at Vernon, Sept., 1902, by Harvey.

The eyes are separated about as in the female of *bastardi* or *occidentalis*. The front is reddish-yellow pollinose on the sides like the face; vertex black pilose. The centre of the disk of the thorax has some black pile intermixed with yellow. Otherwise the specimen tallies exactly with Williston's description, and I have no hesitation in placing it here.

58. *Eristalis occidentalis*, Williston.—Apparently a common species. Port Renfrew, Aug. 16, 1901; Victoria, July 20, 1902. Specimens from Harvey, taken at Vancouver, June 21, 1902, and July 20, 1903.

59. *Eristalis flavipes*, Walker.—A single specimen from Harvey, taken at New Westminster.

60. *Eristalis obscurus*, Loew.—Port Renfrew, Aug. 10, 1901; Agassiz, July 18, 1902. Taken by Harvey, Vancouver, July 29, 1902. The writer has taken the species also at Seattle, Wash.

61. *Eristalis hirtus*, Loew.—Two specimens, taken by Harvey at Mt. Cheam, Aug. 5, and another at Vancouver, Aug. 29, 1903.

62. *Helophilus latifrons*, Loew.—One specimen sent me by Harvey, taken at Vernon.

(*Helophilus similis*, Macquart, Banff, Alberta, June 17, 1902.)

63. *Helophilus bilinearis*, Williston.—One specimen at Port Renfrew, July, 1902. Taken also at Seattle, Wash., July 15, 1901. These show no important differences from specimens taken at Fargo, N. Dak.

64. *Helophilus pilosus*, Hunter.—Described in 1897 from Br. Col., one female specimen. No other data given. I have not seen the species.

65. *Pterallastes perfidiosus*, Hunter.—Described in 1897 from two female specimens from Br. Col. No other data given. I have not seen the species.

66. *Triodonta cur*—A male and female of this peculiar species taken at 1902, are a trifle larger and darker in colour than spe Atlantic coast, but in other respects are similar.

67. *Criorhina Kinc*—Taken by Harvey, at Vancouver, April 9 to May 1.. igton, April 17. In all, 10 specimens of this striking s and one female, have been sent me by Mr. Harvey. T derable variation in colour of the pile of the thorax and al erwise all agree very well with Coquillett's description. The t horax varies in regard to the extent of the black, which may include all of the hinder part of the mesonotum except the angles, and all of the scutellum except a fringe of yellow hairs around the edge, or the black may be limited to a bar across the mesonotum, leaving the hind border as well as the scutellum yellow. The greatest variation, however, is seen in the pile of the abdomen. As one extreme, the pile of segments 2 and 4 is light yellow, with that of 3 black, or at most with a few reddish hairs intermixed, while at the other extreme, segments 2, 3 and 4 are covered with reddish pile, with no trace of black on 3. Practically all the intermediate stages are shown by my nine specimens. All agree in having long light yellow pile on the side of segment 2, in having some yellow on the posterior margin of 4, and in having 5 black, with at most a few reddish hairs. In most of my specimens a fringe of long yellow hairs projects, moustache-like, from the epistoma in front. It appears to be broken off in some specimens. The tibiæ and tarsi vary in colour from brownish to yellowish. The last joint of the tarsus is always brown except the pulvilli, which may be yellow.

The female resembles the male closely. The face is only thinly pollinate with yellow. The eyes are separated by about the length of a millimeter. The front is coloured as in the male. The vertex is black.

68. *Criorhina tricolor*, Coquillett.—Vancouver, May 10, 1902; Mt. Cheam, Aug. 5–11, 1903; Grouse Mt., July 19, 1903. Nine specimens in all, both sexes, from R. V. Harvey. I have placed these specimens in this species provisionally, as I have not been able to make out any

structural differences to separate them from *tricolor*. They differ considerably from Coquillett's description in colour markings, and may be a distinct species, but, knowing the tendency of related species such as *C. Kincaidii* and *C. nigripes* to vary in this respect, I hesitate to separate them until further study. Coquillett's type is from Alaska.

69. *Criorhina nigripes* (Williston).—Vancouver, April 9 and 11, 1903, taken by R. V. Harvey. Two specimens, both females. One of these has a distinct margin of yellow hairs on the hinder border of abdominal segments 2 and 3. Otherwise they are identical with Williston's type from California in the Mus. Comp. Zool., at Cambridge, Mass.

70. *Criorhina scitula*, Williston.—Taken at Port Renfrew, Aug. 10, 1902, and by Harvey, at Vancouver, June 22, 1902, and at Mt. Cheam, Aug. 5–10, 1903.

71. *Crioprora alopex* (Osten Sacken).—A specimen was sent me by E. M. Anderson, taken at Victoria, April 16, 1897, and another was received from Harvey, taken at Vancouver, April 12, 1902, both females. I have seen no description of the female, but it is very much like the male in all respects except the following: Eyes widely separated; the yellow-red pile of the front continued back upon the occiput at the middle. Pile of the scutellum light yellowish; in one specimen a few black hairs on the margin; the other has the pile entirely without black.

72. *Crioprora femorata*, Williston.—A single specimen taken by Harvey, at Wellington, April 15, 1903.

73. *Pocota grandis* (Williston).—Harvey has taken this species at Vancouver, Oct. 3, 1902, and at Mt. Cheam, Aug. 7, 1903. Two females are in my possession. They are essentially like the male, differing only in the separation of the eyes. The rather broad front is brownish pruinose, with short dark yellow pile. On the under side the middle tarsi are beset with short sharp black spines, not present on the other tarsi.

74. *Brachypalpus pulcher*, Williston.—Port Renfrew, July 25, 1902, and by Harvey, at Goldstream, Aug. 10, 1902. A specimen is also in my collection marked "Br. Col., Sept. 5, 1897." Both sexes present. The species is described from Washington and Oregon.

75. *Xylota fraudulosa*, Loew.—A single male specimen taken at Port Renfrew, June 26, 1901, undoubtedly belongs here, though a trifle larger than my eastern specimens. It has been recorded in the west from Washington.

76. *Xylota barbata*, Loew.—Port Renfrew, July 25, 1902, and Glacier, Aug. 21, 1902, and by Harvey, at Vancouver, June 19, 1903. Taken also at Seattle, Wash.

77. *Syritta pipiens* (Linné).—Abundant. Port Renfrew, Victoria, Vancouver, Agassiz and Glacier, at dates ranging from July 17 to Aug. 19. Harvey has taken it at Vancouver, June 19, 1903. Taken also at Laggan and Banff, Alberta.

78. *Sphecomyia Pattoni*, Williston.—A single male specimen taken at Glacier, Aug. 21, 1902, I place here with some doubt. In general appearance it is much like *Pattoni*, but it shows the following differences: The ground colour of the face seems to be entirely dull black under whitish pollen, and there is no shining facial stripe; the spots of the thorax white instead of yellow, and there is a fringe of yellow pile on the scutellum; the legs differ in the extent of yellow and black. It may be a distinct species. The type locality of *Pattoni* is Washington.

SOME NOTES ON APHIDIDÆ.

BY T. D. A. COCKERELL.

Macrosiphum ambrosiæ (Thomas). — *Siphonophora ambrosiæ*, Thomas, Bull. Ill. State Lab. Nat. Hist., 1878, p. 4.

Found at Pecos, New Mexico, on *Lactuca*. The following account is based on the Pecos specimens:

Very dark brown, very shiny; legs, antennæ and nectaries black, except that the basal part of legs, to near middle of femora, is brownish-white; stigma pale green; cauda of winged ♀ yellowish-white. Measurements of winged ♀ in μ: Marginal cell about 900, of which about 340 is substigmatal; cubital vein between branches 850 to 970; cauda 450; nectaries about 820, minutely imbricated; beak about 950, last joint about 160; antennal joints, (1) 130, (2) 80, (3) 900, (4) 750, (5) 725, (6) 200, (6a) 1,130; 3 has numerous sensoria on the under side, 4 has no sensoria; the hairs on 3 and basal half of 4 are knobbed, as also are practically all those on the anterior legs.

Young dull reddish, minutely tuberculate, not pruinose.

This Pecos form may be separable as a variety; in Schouteden's table of European species it runs to *M. cichorii* (Koch). It certainly is not *M. muralis* or *M. lactucæ*.

Pemphigus lucifugus (Zehnt.).—*Tetraneura lucifuga*, Zehntner, De Plantenluizen Van het Suikerriet op Java, XV. (1901). Pl. 2, figs. 29–34.

By the venation of the hind wings this cannot be a *Tetraneura*.

Cladobius Beulahensis, n. sp.—Winged ♀: Rather large, robust; head and thorax black; abdomen grayish-brown, dorsum with a broad, dull black band on each segment, sides with large black spots; on the first four segments there is a considerable interval between the bands and the spots; ventral surface of abdomen immaculate, except that the last segment bears a large transverse black spot; insect thinly clothed with short hairs; legs very hairy, dark ferruginous; knees, end of tibiæ, and tarsi black; wings ample, hyaline, not darkened along the veins, stigma large, grayish-brown, fork ample, but shorter than its stem; antennæ reaching second abdominal segment, blackish, third segment ferruginous; cauda broad and rounded, hairy, not produced; nectaries short, distinctly swollen, ferruginous, black at apex, very much longer than broad; beak reaching posterior margin of middle coxæ, or at least their base. Length of insect, 3⅓–3½ mm. Measurements in μ: Antennal joints, (3) 500, (4) 260–290, (5) 250, (6) 170, (6b) 310. Nectaries about 250. The prothorax has a lateral tubercle.

Young dark gray, slightly purplish; femora dull whitish.

Beulah, New Mexico, prox. 8,000 ft., Aug. 4, on *Populus tremuloides*, in little colonies (winged and young) on the twigs. The leaves of the tree were much curled, I suppose by the aphides. Related to *C. bicolor*, but not identical; also clearly distinct from *C. salicti*. By the banded abdomen it resembles *C. pilosus* (*Pterocomma pilosa*, Buckton), but it is not the same. It is not *C. salicis*, and it is certainly not *C. populeus*, as that insect is figured by Buckton. There seems to be some confusion about *C. populeus* (sometimes called *populneus*); it has been recorded from Greenland (Rübsaamen) and Alaska (Pergande), and might be expected in the Rocky Mountains,* but so far as I can make out our insect is quite distinct from it.

Aphis medicaginis, Koch.—Abundant at Pecos, New Mexico, on *Glycyrrhiza lepidota*. Some were found on *Sphæralcea Fendleri* growing near the *Glycyrrhiza*.

Lachnus viminalis (Fonsc.) = *dentatus*, Le Baron.—Pecos, New Mexico, 1903, on *Salix*. New to New Mexico.

Chaitophorus negundinis, Thos.—Pecos, N. M., 1903 (Dr. M. Grabham). *C. populicola*, Thos., was also found at Pecos.

Thirty-eight Aphididæ are known from New Mexico so far.

*The willow-coccid *Eriococcus borealis*, described from Dawson City, N.-W. T., has since been found by me at Beulah, New Mexico.

NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, S. B., M. D., DECATUR, ILL.

(Continued from page 244.)

Prothymia rosario, n. sp.—Expanse: 26 mm.

Fore wings chrome yellow, a pink patch at base of wing, about 3 mm. wide; this is most marked on costa and between median and submedian veins. A subterminal pinkish band, broad at base, where it is confluent with the pink fringe; at centre is narrow and furthest removed from margin, at inner angle it broadens out, becoming again confluent with fringe. Fringe pink, in one specimen slightly paler inwardly. Hind wings pale yellowish white, fringe concolorous.

Beneath, fore wings pale yellowish along costa, outer and inner margins, dusky centrally, with indications of discal dot, pinkish spot at apex. Hind wings as above. Thorax and abdomen yellowish, head darker yellowish, more or less pink intermixed. Palpi yellowish, pinkish at tip. Legs pink externally, pinkish internally.

Type: ♂ and ♀. Huachuca Mts., Arizona, July. One of the specimens from Mr. Poling.

Apatelodes uvada, n. sp.—The general type of maculation is similar to *A. lacetania*, Druce (Biol. Cent. Amer., Vol. II., 437, Pl. 87, fig. 12 and 13), and to *A. diffidens*, H. E. (Entom. Amer. III., 92; Biol. Cent. Amer. II., 438, Pl. 87, fig. 15), but in detail there is a marked difference from the figures as well as from the descriptions. Fore wings light gray, with pale brown shadings, the whole with a slight olivaceous tinge. As in *diffidens*, there is a straight brownish line from junction of basal and middle thirds of costa almost to inner angle. Below this line the wing is gray, above it more or less shaded with brown. On inner margin at inner third are two black spots, one on margin, the other above and extending a trifle farther outward, separated more or less distinctly from first. Beyond these, and only separated from them by a narrow space of ground colour, is a short black bar, which becomes lost before reaching oblique line. The course of the bar and spots is obliquely outward from inner margin, and they seem to be the remnants of a double transverse line, which if angled in the middle of the wing and then run inwardly would strike costa at beginning of oblique line. In one specimen a slight thickening of the oblique line on costa seems to represent a remnant of the transverse line. About 2 mm. further outward a second transverse brown line can be made out; in one specimen this is evidently double on

inner margin. It passes from costa outwardly oblique, along inner side of discal spot to oblique line, whence making somewhat of an angle it runs obliquely inward to inner margin; it is rather faint, but can be followed in both specimens its whole length. A third more distinct brown transverse line leaves costa at outer third, curving outwardly around cell; it then makes a broad inward curve to inner margin at about its outer fourth. Another transverse line runs parallel to third and about 2 mm. from it; it is pale whitish, but in one specimen there is a quite well marked brown inner edging to this, especially at costa and inner margin. In the other specimen this it not so evident. There are two superimposed subapical black wedges, base outwardly, resting on a short pale bar, which terminates below in a small round pellucid dot, which has a minute black dot to its outer side. On holding the wing against the light the pellucid dot is very striking, and there can be seen a second very minute one just above it. Beyond cell the marginal area it clear brownish, but at apex it is mostly gray, and below centre of wings the pale shading on veins, and a broad, rather diffuse included gray shade, cover fully half the space. Fringe brown. Discal spot small, pale, upright. Secondaries reddish brown, with distinct pale mesial band; within this is a narrow dark band, distinct in one specimen, fainter in the other. This terminates in the upper of two brownish black spots on inner margin, well above inner angle. The second lies on upper side of termination of mesial band; in one specimen the spots are somewhat run together. Fringe concolorous or a shade paler.

Under side of primaries reddish, washed with gray along costa, darker reddish brown at apex beyond the distinct pale bar which corresponds to the one on upper surface. A dark reddish extra mesial band and a pale subterminal one. Secondaries: upper two-thirds reddish, lower third pale, the line between the shades being quite sharply defined, very distinct dark reddish brown mesial and pale extra-mesial bands, the latter especially towards inner margin slightly edged on inner side with brown. Very faint, scarcely discernible traces of discal spots on both wings. Head and thorax concolorous with base of primaries, abdomen with secondaries. Patagia gray, with brown transverse band, near but not quite at tip. Palpi, coxæ and inner side of fore tibiæ brownish, rest of legs gray, abdomen beneath fuscous, laterally with small blackish tufts.

Types: 2 ♂'s. Pima Co., Arizona, July. Mr. Poling. It is possible this may be the same as Dr. Dyar's *pudefacta*, the description of which has just reached me.

Hemiceras pilacho, n. sp.—Expanse : 28 mm.

Ground colour pale yellow, rather thinly dusted over with golden yellow scales. Body parts with more of a brownish tint. Front of head with round turreted projection, yellowish brown, with black centre and black ring. Thorax, largely denuded in the specimen before me, is somewhat darker than abdomen. T. a. line somewhat outwardly oblique, formed of three large teeth, one from costa to median vein, one between median and submedian veins, third between latter and inner margin, dark golden yellow. T. p. line runs from junction of outer and middle thirds of inner margin obliquely outwards almost to apex, where it curves inward slightly before reaching costa, the same colour as t. a. line. A very faint trace of s. t. line, scarcely to be noticed. Ordinary spots concolorous, outlined with golden yellow scales. Orbicular large, round. Reniform large, oval, slightly inwardly oblique, joined to orbicular by a slightly thicker accumulation of the dark yellowish scales than elsewhere. Veins of wings slightly darker. Fringe fuscous, with an even dark golden yellow basal line. Hind wings white, with a faint yellowish tinge, very slightly dusky at extreme edge. Fringe concolorous, faint, slightly darker, basal line.

Beneath very pale yellowish colour. Orbicular and reniform showing as obscure paler spots in cell. T. p. line showing faintly through wing. Wing very slightly darkened through cell and along veins beyond it. Hind wings pale yellowish white, slightly darker along costa.

Type : 1 ♂, So. Arizona. Mr. Poling.

Eunotela moqui, n. sp.—Expanse : 33 mm.

Fore wings light gray, with a slight reddish flush. Basal line double, slightly angled on median vein, inner portion black, outer brownish. Beyond this a diffuse black shade across wing, outwardly curved to median vein, then inwardly curved to inner margin. T. a. double, black, distinct, slightly outcurved. A small diffuse black spot on costa beyond t. a. line. T. p. line double, inner portion black, outer brown, distinct and scalloped between veins below cell, both lines brown opposite cell, lunular and preceded by a distinct black lunular bar in cell, which is continued to costa, after making a slight angle on subcostal vein. S. t. line irregular, broken, somewhat diffuse, not sharply defined, more pronounced in upper two-thirds of wing, at costal end a small black dash running almost but not quite to apex. Distinct black terminal line, quite even in upper, somewhat irregular in lower half. Veins more or less darkened. Fringe

concolorous, with pale points at end of veins. Hind wings white above and below. Fore wings smoky beneath, with about four pale points on costa, towards apex. Antennæ shaft yellow, pectinations brown. Head and thorax dark gray. Abdomen ochraceous above, dirty white below.

♀, fore wings a trifle darker, with markings somewhat heavier, especially the terminal line, while the subterminal line is equally heavy to inner margin. Secondaries broadly fuscous outwardly, with faint mesial band.

Type: 1 ♂, So. Arizona, July; 1 ♀, Santa Catalina Mts., Pinal Co., Ariz. Mr. Poling.

Hapygia estrella, n. sp.—Closely allied to *H. xolotl*, Schaus (Proc. Zool. Soc., London, 1892, p. 339; Biol. Cent. Amer. II., 464, Pl. 91, fig. 19), but differs from figure and description, and Mr. Schaus, who on a recent visit kindly examined most of the species described in the present paper, thinks it distinct from his species.

♂ expanse: 50 mm.; ♀, 57 mm.

Colour of male chestnut, of female darker, almost walnut-brown. Basal line faint but traceable, pale, with dark brown border. T. a. faint, outwardly oblique, somewhat wavy, pale, with slightly darkened border. In female there is a dark shade between t. a. and basal line on lower half of wing. T. p. line pale, with slightly darker outer border, distinct but not prominent, inwardly oblique from costa, slightly outcurved over cell, then with a slight inward curve to inner margin. A faint black, broken subterminal line, emphasized at apex so as to form a short oblique apical dash, within which is a metallic silver mark. In cell is a slightly outwardly oblique oblong silver ring, constricted in middle, with small dot of silver joined to its upper inner side. The centre of ring is silver filled, leaving a narrow border of ground colour. There is a second small round silver spot in cell to inside of upper end of first; in the female this has a fine central dot of ground colour, in the male it is solid. Fringe concolorous outwardly, paler within. Inner margin incised and toothed, more marked in female. Hind wings paler than fore, pale reddish fuscous in male, blackish fuscous in female.

Beneath fore wings much paler than above, even light reddish brown, somewhat darker in centre and along costa. Two pale spots in cell

corresponding to silver spots above. Hind wings still paler, with faint traces of mesial band in female. Head, collar, patagia and thorax concolorous with fore wings. Abdomen with more of a yellowish tinge above, beneath paler.

Types: 1 ♂, 1 ♀, Pima Co., Arizona, July. Mr. Poling.

Gloveria coronada, n. sp.—Expanse: ♂, 70 to 85 mm.

Chocolate brown, one specimen slightly grizzled with gray. Hind wings a shade lighter than fore. Fore wings with two pale whitish transverse lines, one at inner fourth, moderately outcurved, even, distinct, about ½ mm. in width. Outer line at about outer third broadly outcurved around cell, then with slight inward curve to inner margin, at a point somewhat beyond middle. The two lines are thus about twice as widely separated on costa as on inner margin. The subterminal space is somewhat paler than the concolorous terminal, in one specimen markedly so. The subterminal line is only indicated by the contrast between the two; it is irregularly dentate, the pale extending outward along the veins, almost to margin in places. A minute pale discal dot. Hind wing with faint trace of pale mesial band. Fringes concolorous, extreme edge whitish. Head and thorax concolorous, abdomen paler. Beneath fore wings much paler than above, hind wings grayish at base, gradually darkening to outer margin, where it is same shade as fore wings. Distinct pale mesial band on both wings, fading out on hind wings before reaching inner margin. There is a brown inner accompanying shade line, more or less evident, especially on hind wing. Thorax and legs concolorous with fore and abdomen with hind wings. Antennæ brown.

Types: 4 ♂'s, Huachuca Mts., Arizona; 1 ♂, Chiricahua Mts., Ariz. Mr. Poling.

The colour and maculation remind one very strongly of *psidii*, but the shape of the wings is altogether different, being much broader, more like *Io*, or judging from the description, like *quadrina*.

The above description applies to four of our specimens, a fifth, however, more recently received from the Chiricahua Mts., has the ground colour of the fore wings replaced by gray to a much greater degree, the transverse lines appearing brown, with faint pale accompanying shades, and the subterminal line as an irregular row of brown spots. The variation being the same so commonly seen in *Malacosoma (Clisiocampa)*.

LIST OF ADDITIONAL MANITOBA LEPIDOPTERA.

BY E. FIRMSTONE HEATH, CARTWRIGHT, MAN.

Since Mr. A. W. Hanham published his lists of Manitoba Lepidoptera in the CANADIAN ENTOMOLOGIST (1897–1901), many additional species have been taken in the Province by myself and others. Where no special locality is given in the following list, the capture was made by me on my farm on the Long River, and in almost every instance the identification has been made by Dr. John B. Smith, to whom my warmest thanks are due for the kindly trouble that he has taken with my material.

Sphinx Vancouverensis, Hy. Edw.—At light during June and July in about equal numbers with the form *albescens*, Tepper.

Hyphantria textor, Harris.—Only one at light in July.

Apantesis determinata, Neum.—A form of *Williamsii*, Dodge, in the previous list.

Apantesis michabo, Grote.—Rounthwaite, May 20 (Marmont).

Apantesis oithona, Strecker, *a.* rectilinea, French.—At light at Rounthwaite, Aug. 5 (Marmont). Bred from larvæ on *Castilleja sessiliflora* at Aweme (Criddle and Fletcher).

Thyris lugubris, Boisd.—Rounthwaite (Marmont). Sandhills near Aweme, flying in bright sunshine, July 20 (Criddle and Fletcher).

Alypia octomaculata, Fabr.—Several taken flying in the sunshine about wild raspberry bushes when in flower, together with *Langtonii*, Couper.

Acronycta hastulifera, Sm. and Abb.—July ; taken at sugar occasionally.

Acronycta leporina, Linn.—Several taken at sugar, June and July, 1899.

Acronycta superans, Guén.

Acronycta albarufa, Grote.—July ; at sugar occasionally.

Acronycta inclara, Smith (hamamelis, Guén).

Acronycta illita, Smith.—June ; at sugar. This is one of the earliest to appear.

Acronycta modica, Walk.—One taken at sugar in July.

Moma geminata, Smith.—Previously recorded as *fallax*, H.-S.

Platysenta videns, Guén.—July ; several at sugar and light.

Hadena vultuosa, Grote.—June 25, etc. ; sometimes plentiful at sugar.

Hadena cogitata, Smith.—June ; a few at sugar most years.

Hadena lona, Strecker (runata, Smith).—July ; a few at sugar. Winnipeg at end of June ; a few at light (Hanham).

Hadena ferens, Smith.—August ; at sugar, one only taken in 1903.

Hadena adnixa, Grote.—August ; at sugar, one only taken in 1903.

Hadena claudens, Walk.—August ; a few at sugar.

Hadena allecto, Smith.—Kinosota (Hutchinson) ; also taken in British Columbia and Dakota.

Adita chionanthi, Sm. and Abb.—Several at sugar ; August, 1900 and 1901.

Rhynchagrotis gilvipennis, Grote. This was prevously reported under the name *chardinyi*, Boisd.

Euretagrotis sigmoides, Guén.—Not infrequently at sugar in July.

Euretagrotis attenta, Grote.—With the preceding species.

Noctua rosaria, Grote.—Previously recorded as *rubifera*, Grote. It is generally abundant both at light and sugar during June and July, whereas *rubifera* is scarce here, one only having been identified in my collection by Dr. Smith.

Noctua inopinatus, Smith.—One only recognized so far.

Chorizagrotis soror, Smith.—One taken at sugar or "honey-dew" on black cherry with others of the genus ; in June.

Chorizagrotis auxiliaris, Grote.—Several at sugar and honey-dew in June.

Chorizagrotis agrestis.—With the preceding species.

Chorizagrotis balanitis, Grote.—One taken at sugar, July 8, 1903.

Euxoa maimes, Smith.—Two taken at light with *divergens* in May ; the two species have previously been confused. Brandon (Hanham).

Euxoa citricolor, Grote.—One at sugar, Sept. 29, 1903.

Euxoa acornis, Smith.—Occasionally at sugar in July.

Euxoa fuscigera, Grote.—Several at sugar, July and August, 1903.

Euxoa intrita, Morr.—Found among some duplicates, date wanting.

Euxoa titubatis, Smith.—A few at sugar in July.

Euxoa verticalis, Grote.—A few at sugar in July.

Euxoa albipennis, Grote.—A few at sugar in July.

Euxoa furtivus, Smith.—A few at sugar, July and August.

Euxoa perexcellens, Grote.—Occasionally at sugar with *insulsa*.

Euxoa abar, Strecker.—One at sugar, Sept., 1903.

Euxoa nordica, Smith.—Occasionally at sugar, June and July.

Prodenia ornithogalli, Guén.—Winnipeg, at sugar, Oct. 19, and later, 1900 (Hanham).

Psaphidia Grotei, Morr.—Winnipeg and Brandon, rare (Hanham).

Ufeus satyricus, Grote.—At sugar, others in the house in October.

Mamestra imbrifera, Guén.—A few at sugar in June.

Mamestra Oregonica, Grote.—At sugar with *trifolii*.

Mamestra Goodellii, Grote.

Mamestra lucina, Smith.—At sugar. Previously recorded as *olivacea*, Morr.

Mamestra circumvadis, Smith.—Aweme (Criddle).

Nephelodes tertialis, Smith.—Winnipeg, August 16–24 (Hanham).

Rancora albicinerea, Smith.—Rounthwaite, April 24 (Marmont).

Bellura gortynoides, Walk.—A few taken at light, decidedly rare June 18–30.

Morrisonia sectilis, Guén.—A few at sugar, August 12, 1903.

Leucania minorata, Smith.—Previously listed as *pallens*, Linn.

Leucania obscurior, Smith.—Previously listed as *albilinea*, Hubn.

Leucania megadia, Smith.—At light in July. At first confused with *insueta*, Guén.

Himella contrahens, Walk.—Listed as *thecata*, Morr.

Tæniocampa peredia, Grote. Two or three at sugar, July, 1900. Not seen since.

Xylina hemina, Grote.—Several at sugar, during October, 1903.

Xylina amanda, Smith.—Previously listed as *contenta*, Grote, which does not seem to occur here.

Xylina holocinerea, Smith.—Several at sugar, during September and October, 1903.

Xylina Oregonensis, Harvey.—One only at sugar, in October.

Xylina unimodia, Lint.—Several at sugar, in September and October.

Xylina Grotei, Riley.—Several at sugar, in September and October.

Xylina antennata, Walk.—Several at sugar, in September and October.

Xylina tepida, Grote.—Several at sugar, in September and October.

Xylina, n. sp., in Dr. Smith's hands for description.

Cucullia postera, Guén.—Taken but once, some years ago.

Nonagria subflava, Grote. Taken occasionally at light in the middle of August, both here and at Winnipeg.

Papaipema rigida, Grote.—Listed before as *cerina*, Grote.

Papaipema nebris, Guén.—One taken at light in August.

Papaipema circumlucens, Smith.—A few at light in August.

Pyrrhia umbra, Huful.—One at currant bloom, in May, and a few at sugar, in August and September.

Orthosia decipiens, Grote.—Winnipeg.

Orthosia inops, Grote.—A few at sugar.

Cosmia punctirena, Smith.—A few at sugar, in August, 1900.

Epiglæa decliva, Grote.—Several at sugar, September and October, 1903.

Copablepharon grandis, Streck.—One only, at light, August 1, 1899.

Heliothis armiger, Hubn.—One at light, Winnipeg (Hanham).

Xanthoptera semiflava, Guén.—A few taken nearly every year on the prairie in the day time, by beating clumps of *Eleagnus argentea*, in July.

Melicleptria villosa, Grote.—At St. James, Winnipeg, taken in 1900, July 29 (seven), Aug. 4 (seven), Aug. 5 (five). A white daisy-like flower, *Erigeron glabellus* (determined by Dr. Fletcher), occurred in scattered patches in a meadow, and these pretty little moths were all found resting on the centre of the flowers. They were hard to see, and more often than not would fall to the ground and lie close to escape capture (Hanham).

Syneda Athabasca, Neum.—Beulah.

Syneda Allení, Grote.—Aweme.

Catocala abbreviatella, Grote.—One or two at sugar, late in July.

Homoptera unilineata, Grote.—A few at sugar, May 13; also flying about cherry and plum bloom.

Erebus odora, Linn.—Winnipeg, August 14, 1900. A male with wings rather frayed alighted on a tree when I was renewing the sugar on it at dusk (Hanham). Beulah (Dennis).

Epizeuxis rotundalis, Walk.—A few at sugar, in July.

Zanclognatha protumnusalis, Walk.—A few flying in July.

Ianassa Coloradensis, Hy. Edw.—One only; July 10, 1903.

Schizura concinna, Sm. and Abb.—Reared from larvæ some years ago; they were quite numerous on Populus aspen; larvæ not seen since. One moth taken at light.

Drepana arcuata, Walk. One taken on the wing in June.

SYNOPSIS OF PROSOPIS AND COLLETES, WITH SUPPLEMENTARY NOTES AND DESCRIPTIONS.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

This paper belongs with the series on local species—Andreninæ, Megachilidæ and Bombinæ, Tr. Am. Ent. Soc., *28*: 187; *29*: 163; Sphecodinæ, Ent. News, *14*: 103; Balictinæ, Nomadinæ, Epeolinæ, Anthophila, CAN. ENT., *34*: 245; *35*: 172, 284; *36*: 37.

For the length of the malar space is taken the shortest distance between the eye and the mandible; the breadth is that of the mandible at base; joint refers to antenna, segment to abdomen; cells III_5 and III_4 are the second and third submarginal cells.

Of 81 specimens formerly referred to *P. modesta*, Say, 45 are referred to *P. Illinoiensis*, and 36 to *P. Sayi*, sp. nov. I have given up the attempt to identify *P. modesta*, Say. The type of *P. Sayi* is a pair taken in copula on flowers of *Heracleum lanatum*, June 4, 1888. Both have a dot on tegula.

According to my separation of them, *P. Illinoiensis* sometimes has a dot on tegula, and *P. Sayi* often has. The determination of *P. affinis* thus becomes more doubtful than ever. I use the name *P. ziziæ* for the insect I have always called *P. affinis*, Sm.

PROSOPIS, Fabricius.

Females

Front coxa with a lateral tooth: eyes short; cheeks broad; face marks, tubercles, sometimes two lines on collar, front and middle knees, and base of hind tibiæ, yellow; enclosure of metathorax rugose on basal middle; 6 mm ..... thaspii.

Front coxa simple; eyes long; cheeks narrow; at least bases of tibiæ yellowish; metathorax usually more rugose ..... 1.

1. Segment 1 and base of 2 red; face marks, tubercles, and dot on tegulæ, yellow; wings beyond middle clouded; 6–7 mm ..... nelumbonis.
   Segments 1–6 black ..... 2.
2. Collar with yellow marks; tubercles and face marks yellow; 5–6 mm. 4.
   Collar black; 4–5 mm ..... 3.
3. Entirely black, except bases of tibiæ and sometimes narrow lines on face; slender ..... saniculæ.
   Clavate face marks present; usually a spot on clypeus, tubercles and tegulæ; a little more robust ..... pygmæa.

4. Edge of wing base and spot on tegulæ yellow.....ziziæ.
Edge of wing base black ; tegulæ black ; sometimes with a yellow dot .....5.

5. Metathorax more rugose, more pubescent ; enclosure less distinct, bordered by an impressed line, often obscured by the reticulations ; face marks more yellow, less produced, more rounded on eye margin ; wings more fuscous : flagellum darker ; rarely a dot on tegula .....Illinoiensis.
Metathorax less rugose, less pubescent ; enclosure more distinct, bordered by a raised line ; face marks paler yellow, more produced and pointed on eye margin ; wings more hyaline ; flagellum paler beneath ; tegula often with a yellow dot ; *sp. nov.:* 36 specimens .....Sayi.

Males.

Front coxa with a lateral tooth ; metathorax moderately rugose ; spot on labrum, scape exteriorly, two lines on collar, and tubercles, yellow; face marks somewhat club-shaped on the sides ; 5 mm.....thaspii.

Front coxa simple ; metathorax more rugose ; at least the face, tarsi, anterior tibiæ in front, and middle and hind tibiæ at base, yellowish .....1.

1. Base of abdomen red ; 6 mm .....nelumbonis.
Base of abdomen black.....2.

2. Face mark broken into four parts by the irregular encroachment of black in the sutures ; elsewhere black, except on the legs ; scape broad, clavate ; 4–5 mm.....saniculæ.
Face mark entire ; tubercles coloured.....3.

3. Lateral extension of face mark usually club-shaped, always diverging from eye ; scape exteriorly and sometimes dot on tegulæ pale yellowish ; 4 mm.....pygmæa.
Lateral extension of face mark ending near eye ; usually two lines on collar ; 5–6 mm.....4.

4. Scape concave exteriorly; spot on tegulæ, edge of wing base, labrum, mandibles more or less, often the scape exteriorly, yellow ; face mark club-shaped laterally ; yellow at base and apex of middle tibiæ connected.....ziziæ.
Scape ordinary ; tegulæ, labrum and mandibles rarely with yellow...5.

5. Middle and hind tibiæ with a blackish spot behind, hind ones often entirely yellow; segment 1 impunctate; face mark sometimes club-shaped laterally; flagellum darker; tegulæ unspotted; wings more fuscous ..... Illinoiensis.

Middle and hind tibiæ yellow at base; segment 1 punctate; face mark pointed on eye margin; flagellum paler beneath; tegulæ sometimes spotted; wings hyaline ..... Sayi.

COLLETES, Latreille.

Females.

Front coxæ with distinct hairy spines; malar space one-fifth to one-fourth as long as wide; 9–11 mm ..... 8.

Front coxæ without distinct hairy spines ..... 1.

1. Thorax above with pubescence ochraceous, not mixed with black; 10–11 mm ..... 7.

Thorax above with pubescence griseous, mixed with black ..... 2.

2. Ventral segment 6 bicarinate; metathorax rounded, with triangular, rugose reticulated enclosure; joint 3 longer than 4 or 5; malar space one-third as long as wide; 9–11 mm. ..... compactus.

Ventral segment 6 simple; metathorax truncate, with transverse series of subquadrate pits ..... 3.

3. Hind metatarsus about twice as long as broad; clypeus broadly sulcate; labrum concave, striate; joint 3 nearly = 4–5; spurs dark; malar space one-fourth as long as wide; 9–11 mm... latitarsis.

Hind metatarsus three or four times as long as broad ..... 4.

4. Postscutel anteriorly with transverse series of subquadrate pits; rather bare; coarsely punctured; malar space linear; 10–12 mm.. nudus.

Postscutel anteriorly without transverse series of subquadrate pits.. 5.

5. Clypeus in profile strongly convex, closely and evenly punctured; joint 3 nearly = 4–5; malar space linear; 9–10 mm.. brevicornis.

Clypeus in profile slightly convex, somewhat sulcate, puncto-striate. 6.

6. Malar space more than one-third as long as wide; clypeus shining, coarsely puncto-striate; front coxæ simple; 12–13 mm.. inæqualis.

Malar space hardly one-third as long as wide; clypeus opaque, finely puncto-striate; front coxæ with blunt spines; 9–11 mm.. Willistonii.

7. Clypeus opaque, finely punctured, not sulcate; pubescence of mesonotum very fine and dense; abdomen opaque, finely punctured, fasciæ very even; nervures pale; malar space about one-fifth as long as wide ..... speciosus

Clypeus shining, coarsely puncto-striate, sulcate; abdomen shining, rather coarsely punctured, fasciæ often obscured by moisture; nervures dark; malar space about one-third as long as wide ..... eulophi.

8. Prothorax with strong lateral spines; pubescence above mixed with black; segment 1 distinctly punctured, extreme sides fasciate, 2 fasciate at base and apex; scutel puncto-striate; malar space short ..... armatus.

Prothorax without strong lateral spines; pubescence of thorax above not mixed with black ..... 9.

9. Segment 2 rather coarsely punctured; fasciæ narrow; cell III_5 narrowed about one-half above; claws cleft, the divisions nearly equal ..... æstivalis.

Segment 2 minutely punctured, or impunctate; fasciæ broad; cell III_5 not so strongly narrowed above ..... 10.

10. Wings whitish; pubescence white; inner claw tooth subapical ..... albescens.

Wings yellowish; inner claw tooth median; hind spur more distinctly pectinate ..... 11.

11. Pubescence ochraceous; cell III_5 little longer than III_4 .. Americanus.

Pubescence whitish; cell III_5 longer than III_4; sp. nov ..... similis.

Males.

Antennæ long, joints much longer than wide ..... 4.

Antennæ short, joints shorter, or hardly longer, than wide ..... 1.

1. Joint 3 longer than 5; labrum bituberculate; clypeus convex; pubescence pale; malar space linear; 8 mm ..... brevicornis.

Joint 3 not longer than 5 ..... 2.

2. Posterior face of metathorax coarsely, closely, distinctly punctured; abdomen coarsely punctured; labrum with median fovea; joints of antennæ a little longer than wide; flagellum beneath, tarsi, tibiæ more or less and their spurs, testaceous; malar space linear; 11 mm ..... Robertsonii.

Posterior face of metathorax shining, reticulated, impunctate; abdomen rather finely punctured; malar space more than one-third as long as wide ..... 3.

3. Hind metatarsus about twice as long as broad, with a posterior lobe; clypeus broadly sulcate; labrum striate; front femur with long white hair; thorax above mixed with black; 9–10 mm...latitarsis.
   Hind metatarsus about three times as long as broad; 8–9 mm.....Willistonii.
4. Joint 4 shorter than 2–3, not much longer than 3; labrum plane, or with a faint fovea; ventral segments 2–5 strongly bearded laterally; malar space short; thorax above ochraceous; cell III_5 short, strongly narrowed above.....æstivalis.
   Joint 4 about as long as 2–3.....5.
5. Malar space at least about one-half as long as wide.....8.
   Malar space not more than one-third as long as wide.....6.
6. Postscutel with transverse series of subquadrate pits; 9 mm...nudus.
   Postscutel densely punctured and pubescent.....7.
7. Mesonotum rather evenly punctured; prothoracic spines indistinct; pubescence ochraceous; 8 mm.....Americanus.
   Mesonotum with two densely punctured submedian streaks; prothoracic spines distinct; pubescence griseous or whitish, usually mixed with black on vertex and thorax above; 8–9 mm..armatus.
8. Metathorax with triangular rugose enclosure; maler space as long as wide; pubescence mixed with black above; 9–10 mm..compactus.
   Metathorax truncate; with transverse series of subquadrate pits ...9.
9. Pubescence of scutel mixed with black; malar space shorter than wide; 10–12 mm.....inæqualis.
   Pubescence of scutel not mixed with black; 7–8 mm.....10.
10. Punctures of mesonotum and scutel about equal in size; malar space shorter than wide; pubescence rather dense, ochraceous..eulophi.
    Punctures of mesonotum rather fine and sparse, of scutel very coarse; malar space nearly as long as wide; pubescence thin, griseous.....productus.

Megachile strophostylis, sp. nov., ♀.—Black; closely punctured and hardly shining; pubescence rather long and pale; short, thin and black on vertex, mesonotum, scutel, discs of segments 2–5, and base of 6; lateral ocelli about equally distant from vertex and nearest eye; mandibles

with four broad teeth; clypeus short, sparsely punctured, except at base, margin dentate; mesonotum anteriorly with two oblique lines of whitish pubescence; segment 1 short, with a broad concavity, 2–5 with unusually broad fasciæ of pale pubescence; segment 6 very short and broad, a little convex in profile, clothed with long, appressed, glittering, yellowish or whitish pubescence, sometimes blackish at tip; scopa white, a little fuscous on segment 6; hind tibiæ broader than metatarsi; 12–14 mm.; 5 specimens.

In the paper on Sphecodinæ, Ent. News, *14*: 103, Stelidium is a slip of the pen for Sphecodium.

Andrena polemonii belongs to Ptilandrena.

BOOK NOTICE.

INSTINCT AND INTELLIGENCE IN THE ANIMAL KINGDOM.—A Critical Contribution to Modern Animal Psychology, by Eric Wasmann, S. J. (Authorized Translation of the Second and Enlarged Edition).—B. Herder, St. Louis, Mo.

This is a book which ought to be read by every scientist for the clear insight which it gives into the dangers of drawing rash conclusions. Wasmann excels in clearness of thought, but most of all for his insistence upon accuracy in using terms. He gives the clearest definition of "instinct" we have ever met with. It is short, but full: "Instinct is a sensitive impulse to actions that are unconsciously adaptive"; or, more fully, "A sensitive impulse which induces a being to perform certain actions, the suitableness of which is beyond the perception of the agent that performs them," while "intelligence" is the "power of formal conclusion." Again, he says, "there is a power of sensitive cognition which guides instinctive actions belonging to the exterior senses, and there is also an interior sense which perceives the interior state of the agent and feels the pleasant or disagreeable impression which the object of the exterior sense-perception makes upon it; hence we must add the power of sensitive imagination, and a sensile memory which reproduces exterior sense-perceptions and interior sensile feelings, and combine them, one with another, and with new sense-perceptions according to the nature

and laws of sensitive imaginations." Hence, instinctive actions arise when these faculties act to represent as pleasant to an agent what is objectively useful for its preservation, and that of its kind. But "intelligence" combines, with all this, deliberative thought, which takes in every aspect of the case, and draws conclusions of various kinds, both for the present and for the future. Hence, as the result of the study of the actual life and conduct of the creatures other than man, our author contends, and, we think, succeeds in maintaining his contention, that, in the correct sense of the term, those creatures cannot be proved to have "intelligence." He refuses agreement with the modern school of animal psychology on the ground that that school is lax in its use of the term intelligence. Their reasoning is, he thinks, founded on what is termed in logic, "ambiguous middle"; they really use "intelligence" in a double sense. In fact, all attempts to get even the most domesticated animals to "think" have proved abortive. Even Sir John Lubbock's poodle "Van" was a failure. Sir John tried to get his poodle to "read" by having two cards, one inscribed "food," and the other "out," and trained Van to bring the card "food" when hungry, and the other "out" when he wanted a walk. But Van often blundered. Lady Lubbock's lap-dog "Patience," though she had abundant opportunities of seeing the lessons, failed to take them in, nor did Van ever make the least attempt to teach her. There is no proof from even the case of ants that there is more in their actions than can be accounted for by our author's theory when these cases of ant "intelligence" are investigated by really scientific methods and human imagination is not called in to assist deductions.

The attempt, therefore, to prove, as modern animal psychologists try to do, that the intelligence of man differs only in degree, not in kind, from that of the lower creatures cannot be said to be at all established. Man is a thinking creature; he has a spiritual nature, not shared in by creatures lower than himself.

Then as regards "speech"—language—reasoning speech, so to call it, no animals but man have it, nor, in all these years of their existence, have they ever appeared even to seek to acquire it. Speech is the result of human and superior intelligence, and is the vehicle of reasoning thought properly so called.

There is a magnificent chapter on the "different forms of acquiring knowledge," which is, to our mind, one of the best portions of the book.

Another good chapter is that on a "Uniform Standard for Comparative Animal Psychology."

We would earnestly commend to all scientists a careful study of Chap. VII., Bk. V., in Mills' Logic, "on Fallacies of Confusion," as most useful to them in building up their theories. It has always appeared to us that modern animal psychologists are faithless to their theory of evolution. Evolution teaches us that there is an ever upward step in the succession of being; hence we should expect that this would take place in the case of man, the present culmination of all previous evolutions of being. This, Revelation makes known. Creatures below man have had evolved for them, in rising degrees, a sensitive soul, that can direct them to act suitably to their needs for obtaining good and avoiding harm. The next step would be the "evolution," so to call it, of a creature that would add intelligent reasoning, and a deeper insight into the true nature and reason of things; a being that would more nearly, in this and other ways, e. g., the moral sense of right and wrong, approach the character of the Great Author and Ruler of all. Man is clearly seen to surpass other creatures, especially in this last respect. Man has a conscience as regards, if we call it so, the abstract nature of good and evil as principles of conduct, not merely of expediency. The best of men in all ages have felt that they were not mere clods of the valley, but had a future. Revelation explains this by letting us know that that which differentiates man is his threefold nature; his highest constituent being his spirit, in which reside and act his intellectual and reasoning powers properly so called. Science, if it does not attempt to go beyond its province by calling in imagination to its aid, will find itself stopped at a certain point. If it assures us that acts and thoughts are the results of motion, or change, in the brain cells, it cannot tell us what that mysterious thing is that connects will, or thought, with that motion or change. Why not, then, accept the explanation afforded by Revelation? It is answered: Revelation does not clear up the mystery. No more it does; but it gives us the information that man has a nature not wholly common to other creatures, but is possessed of a constituent that enables him to see, more and more, into deep things and thoughts, and the next step higher will be when the new man "Shall know even as he is known." W. E. COOPER.

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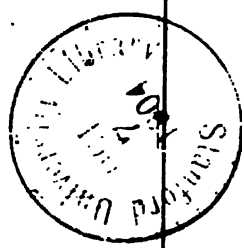

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REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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The Canadian Entomologist.

VOL. XXXVI. LONDON, OCTOBER, 1904. No. 10

A NEW GENUS AND SOME NEW SPECIES OF HYMENOPTERA FROM THE PHILIPPINE ISLANDS.

BY WILLIAM H. ASHMEAD, M. A., D. SC., WASHINGTON, D. C.

All of the Hymenoptera described in this paper were received from Father W. A. Stanton, who captured them in the Observatory Garden at Manila, P. I.

Family X.—STELIDIDÆ. Cœlioxys, Latr.

Cœlioxys Manilæ, new species.— ♀. Length, 6.5 mm. Black; the cheeks, temples, clypeus and the face upwards to the front ocellus, the mesopleura, sternum, coxæ, metathorax, and the apical margins of the ventral and dorsal abdominal segments, clothed, rather densely, with a whitish pubescence, sometimes tinged with yellow; there are also triangular spots of a yellowish pubescence on the anterior and posterior margins of the mesonotum and on the base of the scutellum; the head and thorax are rather coarsely, closely punctured, opaque, while the abdomen is shining, although distinctly punctate, the punctures sparse and separated; the pygidium is bi-impressed at apex with a short median carina separating the impressions, the punctures being coarser and closer in the impressions or towards apex; the mandibles medially and the legs are red, the femora beneath and the tibiæ outwardly being clothed with a short, fine, dense, whitish pubescence. Wings hyaline, but faintly fuscous towards their apical margins, the tegulæ dark rufo-piceous, shining, the stigma and veins very dark fuscous, almost black.

Type.—No. 8103, U. S. N. M.

Manila (Father Stanton).

Family XII.—ANDRENIDÆ. Halictus, Latr.

Halictus Manilæ, new species.— ♀. Length, 6 mm. Æneous black, the head from the base of the antennæ upwards greenish metallic, closely punctured, and clothed with a griseous pubescence, the clypeus smooth, but with some sparse punctures, the anterior margin fringed with yellowish hairs; the median process of the labrum is semicircular and bi-impressed at base; ocelli pale or whitish; antennæ black, the flagellum testaceous beneath, the pedicel small, only a little longer than thick, and much narrower than the flagellum; the first joint of the flagellum is

obconical, longer than the second joint, the third joint a little longer than the second; the following joints to the last are nearly equal, slightly longer than thick, the last as long as the first; the mesonotum and the scutellum are smooth and shining, but with minute, scattered punctures; the area at base of the metanotum is rugulose but not bounded by a salient rim, the posterior face smooth, impunctured, the mesopleura closely punctured. The abdomen is oblong oval, smooth and shining, but the derma, under a strong lens, shows some delicate, microscopic, transverse aciculations. The dorsal segments 2 to 5 have a band of white, appressed pubescence at base. The legs are black, with the tarsi ferruginous, the tibiæ, middle femora beneath and the tarsi with a ferruginous pubescence. Wings hyaline, the subcostal and median veins black, the stigma and other veins pale yellowish.

Type.—No. 8104, U. S. N. M.

Manila (Father Stanton).

Family XIX.—LARRIDÆ.

THYREOSPHEX, new genus.

The wasp forming the type of this genus is a true Larrid, but differs greatly in certain characters from all others so far discovered. It falls into the subfamily *Larrinæ*, and between the genera *Tachytes*, Panzer, and *Tachysphex*, Kohl.

My generic table of the genera, published in the CANADIAN ENTOMOLOGIST, Vol. XXXI., 1899, p. 244, may be modified to contain this new genus, as follows:

12. Second cubital cell receiving both recurrent nervures, the first transverse cubitus not angularly broken; face normal ..... Tachytes, Panzer.

Second and third cubital cells each receiving a recurrent nervure, the first transverse cubitus angularly broken at its basal third; face abnormal, with a shield-like plate anteriorly that extends over the base of the antennæ. ♂ (♀ unknown). Thyreosphex, Ashm., gen. nov.

Thyreosphex Stantoni, new species.—♂. Length, 5 mm. Black and shining, with some sparse, microscopic punctures, the face, from the front ocellus, anteriorly more or less rugulose, with irregular, elevated lines, and a distinct median carina; eyes parallel, large, extending to the base of the mandibles; the shield-like plate that covers the base of the antennæ is rounded anteriorly and broadly margined with white; the clypeus is sparsely clothed with silvery hairs; the mandibles have a rufous

spot towards their apex; palpi slender, white; the flagellum brown, with a dusky streak above, the joints of which are rather long and cylindrical, the first joint being about five times as long as thick; the hind angles of the pronotum are subacute, with a white spot at each angle; the mesonotum has two parallel grooved lines; the tegulæ are testaceous, with a white spot anteriorly; legs black, the tarsi honey-yellow, the tibial spurs white; the metanotum has three longitudinal carinæ, the metapleura and the posterior face being striated. The abdomen is oblong oval, smooth and shining, impunctured, but more or less constricted in the first and second sutures. Wings hyaline, the small stigma and the veins brown.

Type.—No. 8105, U. S. N. M.

Manila.—This singular little wasp is named in honour of Father Stanton, whose captures have contributed so much towards advancing our knowledge of the Hymenopterous fauna of the Philippines.

Family XXI.—TRYPOXYLIDÆ. Trypoxylon, Latr.

Trypoxylon Philippinensis, new species.—♂. Length, 6.5 mm. Black and shining, with sparse glittering white hairs, the hairs silvery back of the eyes, on the clypeus, and on the collar; mandibles ferruginous; the extreme apex of the scape, pedicel and trochanters, the tegulæ, bases of all tibiæ, and a band at the base of the second and third abdominal segments are honey-yellow, or testaceous; the front and middle tarsi, the tibial spurs, and the fourth joint of the hind tarsi, are white. Wings hyaline, the stigma and veins, except the costal and median veins at base, dark fuscous, or almost black. The metanotal area is well defined, the area and the posterior face each with a longitudinal median sulcus.

Type.—No. 8106, U. S. N. M.

Manila (Father Stanton).

Family XXXI.—CHRYSIDIDÆ. Hedychrum, Latr.

Hedychrum Stantoni, new species.—♂. Length, 4 mm. Blue, but with metallic greenish or brassy reflections on the vertex in front of the anterior ocellus, on the anterior half of the pronotum and along its sides, on the sides of the mesonotum broadly, on the scutellum at the sides narrowly, on the metanotum, the pro- and meso-pleura, the mesosternum, the hind coxæ within, and some spots on the first and second segments of the abdomen; legs black, with the tarsi, except the basal joint of the hind tarsi, pale or yellowish. Wings hyaline, with the apical third subfuscous, the stigma and veins brown. The head and thorax are rather coarsely,

closely punctured, the metathorax with large, coarse, umbilicate punctures, while those on the abdomen are much smaller, not dense, but separated, except on the first segment laterally, where they are larger and more confluent.

Type.—No. 8107, U. S. N. M.

Manila (Father Stanton).

Family LVI.—Scelionidæ. Telenomus, Haliday.

Telenomus catacanthæ,, new species.—♀. Length, 0.8 mm. Head, thorax and abdomen black, the scape of antennæ and the legs, including the coxæ, brownish yellow, the pedicel and flagellum black; the head and abdomen are smooth, impunctate, the first abdominal segment and the second at base, longitudinally striated, the mesonotum feebly, microscopically punctate and sericeous; the head is transverse, wider than the thorax, about 3½ times as wide as thick antero-posteriorly; the ocelli are arrayed in a triangle, but widely separated, the front ocellus placed in a slight depression, the lateral ocelli rather close to the eye margin, but not quite touching it; the flagellum is subclavate, thickened towards apex, the pedicel obconical, about as long as the first joint of the funicle, the second joint of the funicle is a little shorter than the first, the third is shorter than the second, the fourth and fifth moniliform, the club 5-jointed, the joints, except the last, being a little wider than long. Wings hyaline, the venation light brown, the marginal vein short, hardly half as long as the stigmal vein.

♂.—Agrees well with the ♀, except that the pedicel is brownish yellow, the flagellum alone being black, filiform, tapering off at apex, pubescent, the first joint being a little longer than the pedicel, but hardly as long as the second, which is fully twice as long as thick, the third joint is only about two-thirds the length of the second and more slender, the fourth and following joints to the last being moniliform, the last ovate; the marginal vein is a little longer than in the female, being fully two-thirds the length of the stigmal vein.

Type.—No. 8108, U. S. N. M.

Manila. Described from several specimens bred by Father Stanton from the eggs of a Pentatomid, probably those of *Catacantha Carrenoi*, Le Guillon.

Family LXVI.—Ichneumonidæ. Colpomeria, Holingren.

Colpomeria flava, new species.—♂. Length, 7 mm. Entirely yellow, except the eyes, which are brown, and a rounded spot on the

middle of the mesonotum, a spot enclosing the ocelli, and the tips of the claws, which are black. Wings hyaline, the stigma and subcostal vein yellowish, the costal and other veins black.

Type.—No. 8109, U. S. N. M.

Manila (Father Stanton).

This species mimics a species of *Xanthopimpla* in colour and in the structure of the abdomen, and I first took it for a species in that genus. It has, however, no areolet in the front wings, and agrees structurally, in venation and in the structure of the legs, with genuine *Colpomeriæ*.

Family LXVIII.—BRACONIDÆ. Ischiogonus, Wesmael.

Ischiogonus Philippinensis, new species.—♀. Length, 2 mm.; ovipositor as long as the abdomen. Reddish brown, the head paler, more yellowish, the first and second segments of the abdomen more or less fuscous above, the eyes black, the flagellum fuscous; wings hyaline, the stigma and veins light brown.

The quadrate head is smooth, impunctate; the mesonotal furrows converge and meet posteriorly just in front of the scutellum; the metanotum has a median carina that unites with a transverse carina bounding the upper margin of the posterior face, the latter uniting with the pleural carinæ, the metanotum, therefore, biareolated. The abdomen is elongate oval, as long as the head and thorax united, with the first and second segments longitudinally striated.

Type.—No. 8110, U. S. N. M.

Manila (Father Stanton).

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The library and collections of the Society have been removed from the Y. M. C. A. building on Wellington street, London, to the Public Library building on the corner of Queen's Avenue and the same street. The new room is much larger and more convenient in many respects than the one occupied by the Society during the last eight years, and affords much needed space for bookcases, etc. It is hoped that the change of quarters will produce an increased interest in the Society, and cause its valuable library and collections to be made more use of by the public, to whom they will be open on every alternate afternoon.

The annual meeting is to be held in the Public Library building on Wednesday and Thursday, October 26th and 27th, when many subjects of interest and importance will be discussed.

THREE NEW LYCOSIDS.

BY RALPH V. CHAMBERLIN, SALT LAKE CITY, UTAH.

Brief preliminary descriptions of the following species are given in order that the names may be used in another place.

Lycosa permunda, sp. nov.—♀. Cephalothorax dark brown; a pale narrow median line extending backward from first eye row, widening abruptly in front of dorsal groove, and then gradually narrowing to a point at posterior margin; a broad light-coloured marginal stripe on each side not extending forward farther than the third eye row, its upper margin coarsely dentate, the lower border broken by a few dark dots, but not limited below by a continuous dark line or stripe at margin. Cheliceræ black. Labium and endites dark brown. Sternum dark brown, with a yellow median line. Legs brown, darker distally; beneath unmarked but having a number of dark cross bars above on femora and posterior tibiæ. Abdomen above dark, having the usual lanceolate mark at base followed by a series of light coloured, chevron-formed transverse lines, each ending on each side in a light dot; sides yellowish brown, densely spotted with black; venter also yellowish brown, more sparsely covered with smaller black dots, much as in *helluo*.

Length, 22 mm. Length of cephalothorax, 10.7 mm.; width, 8 mm. Length of leg iv., 30.3 mm.

♂.—Coloured nearly like the ♀, but paler throughout. Marginal stripes of cephalothorax not interrupted below by dark spots. Legs clear brown, without any cross markings on any joints. Palpi yellowish brown excepting tarsus, which is black.

Length, 20 mm. Length of cephalothorax, 10 mm.; width, 7.5 mm. Length of leg iv., 32.4 mm.

Locality: Kansas.

In general appearance the female resembles *helluo*, but is easily separated by structure of epigynum and by various other characters. The male is conspicuously different in its palpal organ and in size, proportion and structure from those of related species. This form also might suggest the *vafra* of Koch, but is not that species.

Pirata aspirans, sp. nov.—♀. Sides of cephalothorax dark brown, crossed by radiating lines of black; a pale-coloured median band enclosing in front the usual dark V-shaped mark; a yellow stripe on each side extending forward as far as third eye row, limited below by a marginal black line; clypeus yellow. Chelicerae reddish yellow. Labium yellow. Endites yellow apically, dusky brown below. Sternum and coxæ of legs

immaculate yellow. Legs yellow, with all joints excepting tarsi banded with black annuli, which on the femora of the first legs are confluent, and on the other joints of the same legs are partially so. Abdomen above black, at sides minutely punctate with yellow; at base a lanceolate yellow mark, having at each side behind middle a small ovate yellow spot, with black dot at centre, and each side of its apex a larger triangular yellow spot; behind is a series of chevron-shaped transverse marks, which become successively shorter caudally, the last few being diamond-shaped and contiguous with each other by their apices. Sides of abdomen above like lateral part of dorsum, but with black reduced to spots over a yellow field below. Venter yellow, dusky in front of genital furrow, and with a dusky median stripe behind epigynum extending only part way to the spinnerets Anterior row of eyes but slightly procurved, shorter than the second; anterior median eyes two-thirds their diameter apart closer to the smaller lateral eyes; anterior lateral eyes three-fourths their diameter from front margin of clypeus, their diameter from eyes of second row; eyes of second row two-thirds their diameter apart; quadrangle of posterior eyes one-fourth as long as the cephalothorax, a little wider in front than long. Epigynum behind at middle shallowly indented or angularly excavated, the side lobes widely rounded.

Length, 3.9 mm. Length of cephalothorax, 1.8 mm.; width, 1.4 mm. Length of leg iv., 7.3 mm. (of tibia + patella, 2.3 mm.).

Locality: Virginia, North Carolina. One specimen from the former locality and two from the latter in company with specimens of *P. bilobata* (Tully). The female of this species is nearest *P. humicolus*, but among other points differs clearly in the form of the spermathecæ. In *aspirans* the spermathecæ lie entirely in front of their openings, whereas in *humicolus* this is not the case. Both these species may be separated from *minuta* by the fact that in them the inferior margin of the cheliceræ is armed with three teeth, *minuta* having but two. The male of *aspirans* is conspicuously different in the form of the scopus.

Allocosa degesta, sp. nov.—♀. *Cephalothorax* shining black, of reddish lustre. *Cheliceræ* the same. *Labium* and *endites* brown. *Legs* nearly as in *funerea*, but light marks on femora more obscure and less contrasted on other joints between the light and dark rings. *Sternum* reddish brown, dark about margins, lighter, more yellowish over middle area. *Abdomen* above nearly as in *funerea*; venter yellow, with a few faint dark dots at sides. *Spinnerets* yellow. *Epigynum* brown, weakly reddish at borders.

Cheliceræ not quite twice as long as the *face* is high. Anterior row of eyes a little longer than the second, nearly straight; anterior median eyes much larger than the lateral, at most one-fifth their diameter apart, still closer to the lateral eyes, not fully one-third their diameter from eyes of second row; anterior lateral eyes not fully their diameter from front margin of clypeus, some closer to eyes of second row; anterior median eyes three-fourths as large as those of second row; eyes of second row about their radius apart; quadrangle of posterior eyes as wide in front as long, only one-sixth as long as cephalothorax. *Spines* of anterior tibiæ greatly reduced, minute; none at all on either anterior or posterior side of joint. Epigynum nearly the same as that of *funerea*.

Total length, 6.6 mm. Length of cephalothorax, 3.2 mm.; width, 2.25 mm. Length of leg iv., 9.4 mm.

Locality: Louisiana.

The other species of *Allocosa* so far described are *funerea*, Hentz; *rugosa*, Keys (*nigra*, Stone, nec *funerea*); and *sublata*, Montg. I have a fifth species not yet described.

STRANGE ATTEMPTED HYBRIDIZATION IN NATURE.

It will doubtless be of interest for me to record what seems to me the strangest cross-copulation between different species of lepidoptera that I have ever heard of. Mr. Arthur Hudson informs me that one night recently he found on a treacled post a ♂ *Orthosia Conradi* in coitu with a ♀ *Noctua Smithii*, and on the same night on another treacled post, a ♂ *Xylophasia lateritia* in coitu also with a ♀ *N. Smithii*. Both pairs remained in cop. for some little time after boxing; but the ♀ ♀ died, probably from dry heat, within about twenty-four hours, without laying. Mr. Hudson's dictum on matters concerning the habits, etc., of our local lepidoptera is unimpeachable, and he says there cannot be any doubt as to the species in each case. Of course it is unlikely that, had eggs been obtained, they would have proved fertile. During my 17 years' experience as a collector I never yet saw even supposed different species in cop., and never heard of copulation between species so widely distinct. The occurrence of the two cases on the same night would seem to suggest that something about the atmospheric conditions had turned the moths a bit "crazy."—F. H. Wolley Dod, Millarville, Alta.

NEW SPECIES OF NORTH AMERICAN ASILIDÆ.

BY E. A. BACK, B. SC., AMHERST, MASS.

Dasyllis cinerea, sp. nov.—Black, shining, with slight bluish reflection; head, thorax, tip of abdomen, and legs with cinereous hair and pile. Length, 12–15 mm.

♂ ♀.—Head black, face cinereous pollinose, mystax and vibrissæ long, composed of moderately-dense cinereous hair, with the exception of a few black ones for the most part confined to the oral margin, but sometimes extending up on the facial gibbosity; ocellular tubercle prominent with black hair; occipito-orbital hairs fine, black and gray, the latter predominating; beard dense, silky, of same gray colour; palpi small, black-haired; antennæ black, first two segments with black and gray hairs. Thoracic dorsum clothed with short gray pile, longer behind; lateral margins with fine black hair; scutellum, with the exception of a few short black hairs on the anterior, and a fringe of longer hairs of same colour on its posterior margin, bare and shining black; halteres yellowish-brown. Abdomen with lateral margins of segments 1–4 with moderately long gray and black pile; dorsum of same segments sparsely clothed with fine black pile, not noticeable without the aid of a lens. Segments 5–6, excepting the middle anterior portion of segment 5, with dense, procumbent, yellowish-gray, sometimes brassy-yellow pile. Venter with spare, long, gray pile; ovipositor of female with long pile of same colour, sometimes is part black; genitalia of male with short black pile and a few longer gray hairs. Legs black; coxæ, femora, on the upper and posterior surfaces, and the tibiæ, excepting the distal third of the posterior pair, with long gray pile and hairs; scattering hairs and bristles on all the legs, a patch of short pile on the upper distal portion of the posterior femora, and the clothing of the distal third of the posterior tibiæ, and of all the tarsi, black. Wings hyaline, slightly fuliginous along the black veins. A distinct bulla on vein at base of discal cell.

Described from two males and one female from Southern Pines, N.C., collected in March by F. Sherman, and one female from Karnes, N. Y., collected June 18. Four co-types deposited as follows: A male and female in the collection of the Massachusetts Agricultural College, one male in the collection of the N. C. Experiment Station, and one female in the collection of the N. Y. State Museum.

Dasyllis Fernaldi, sp. nov.—Black; segments 4–5 of abdomen with fulvous pile. Length, 15–18 mm.

♂ ♀.—Head: pile covering entire head, excepting on the oral and occipito-orbital margins and of palpi, where it is black, dull yellow. Basal segments of antennæ black with sparse yellow pile; third joint covered with a pale pubescence. Thoracic dorsum with short, sparse dull yellow pile intermixed with black on portion above and in front of wings; humeri with small rufous spot and black pile. In no place does the pile completely hide the dorsum. Pleura black with a bronze tinge. Scutellum with short black pile and long bristles. Halteres yellowish.

Abdomen moderately slender; tergum of segment 1 with short black hairs, apparently nude, likewise on segment 2, except pile is yellow and more perceptible; on segment 3 still denser and has more of a fulvous tinge. Longer pile on lateral margins of segments 1, 2, 3, yellow and increasing in quantity. Segment 4 entirely clothed with fulvous pile, excepting a few hairs on lateral margin. This fulvous pile extends back over sides of segment 5 and its anterior border, otherwise segment 5 and following segments with dull yellow pile. Genitalia of male large, with sparse yellow pile and few black bristles. Venter thinly clothed with long yellow pile. Legs black; coxæ with yellow pile; femora and tibiæ, especially on outer portion, with sparse yellow pile, more abundant on anterior legs, rest of pile short, black. Intermediate femora on the anterior side with short row of black bristles. Tarsi black with black bristles and very short yellow pile, varying in amount. Claws black, rufous at base; pulvilli tawny. Wings slightly fuscous. Expanse, 30 mm.

Described from three males and one female from Colorado. Co-types deposited as follows: 1 male in collection of Massachusetts Agricultural College and two males and one female in collection of American Entomological Society, Philadelphia.

I have named this species after Dr. H. T. Fernald, in recognition of his kind services.

Saropogon rufus, sp. nov.— ♀. Rufous; eyes, style of antennæ, tip and upper side of proboscis, front, and occiput of head, line on distal margin of trochanters, and the claws, black. Face covered with fine golden pile, mystax composed of whitish bristles; ground colour of occiput black, hidden beneath a dense golden pubescence. Anterior and intermediate coxæ white pollinose; halteres rufous. Abdomen slender, shining, nearly glabrous; second segment of venter white pollinose.

Pulvilli straw-coloured. All bristles and pile not mentioned, pale or deep rufous. Wings hyaline, slightly fuscous along the brown veins. Length, 14.5 mm.

This species may be readily distinguished from Loew's *adustus* and *combustus*, the types of which I have seen, by its more slender body and the lack of any blackish tinge to the wings. It may be distinguished from Johnson's *bicolor* and *abbreviatus*, the types of which I have also seen, by its long, slender abdomen.

Described from one female captured August 2, Tehachapi, California, by A. P. Morse. Type specimen in collection of Mr. Charles W. Johnson.

Sarapogon albifrons, sp. nov.— ♀. Face white, thorax brownish-yellow, abdomen rufous. Length about 10 mm.

Head everywhere white pollinose; ground colour of face pale straw, of occiput black. Eyes, ocelli, proboscis, and distal half of third antennal joint black. Bristles of mystax, pile of segments 1 and 2 of antennæ, proboscis, and testaceous palpi, and hair of ocellular tubercle, occiput and beard, white; last very slight. Thoracic dorsum and upper portion of pleura and scutellum brassy-yellow pollinose. Lower portion of pleura and the coxæ whitish pollinose. Pile of thorax confined chiefly to dorsum, very short, white; bristles and halteres whitish.

Abdomen rufous, slender, somewhat shining. First segment, especially on sides, spot on posterior angles of four following segments white pollinose; spots on segment 5 very small, and in one instance lacking. White pile most abundant on segment 1, elsewhere extremely scarce and short. Legs pale rufous; distal margins of trochanters and claws black; pulvilli whitish. Two anterior pairs of coxæ with moderately long white pile; femora, tibiæ and tarsi with very short pile of same colour. Tibiæ and tarsi with sordid white bristles, longest on the intermediate pair. Wings pure hyaline with slight violaceous tinge; veins brownish at base of wing, darker outwardly.

This species is smaller than either *adustus* or *combustus*, and is nearer them in form than *bicolor*, *abbreviatus* or *rufus*.

Described from 2 females collected by F. H. Snow, Bill Williams Fork, Arizona, August. One is a somewhat worn specimen, and has lost its antennæ. Two female co-types, one in the collection of the Massachusetts Agricultural College and one in that of the University of Kansas.

Ospriocerus albifasciatus, sp. nov.—Black, thoracic dorsum, posterior margin of 4th and the following segments of abdomen rufous; wings deep fuliginous; legs black. Length, 18 mm.

♂.—Head black; face and occiput white pollinose; mystax, occipito-orbital bristles and beard black. Antennæ black; distal end of the first and the entire small second segment reddish, both with black hair. Lateral margins of proboscis, and the palpi, in certain lights rufous; the latter with black hair. Dorsum of thorax, excepting that of the prothorax and a distinct median line, rufous, with very fine black pile and the usual black bristles; anterior and lateral margins of prothorax with longer black hair. Dorsum of prothorax, a broad stripe running backward over the humeri to the base of the wings, and a short narrow stripe on the mesothorax on each side of the median line, white pollinose. Entire thoracic dorsum when viewed from the side appears thinly covered with a hoary bloom. Pleura nearly glabrous, in certain lights with a reddish tinge; a spot above each coxa shining white pollinose. Scutellum black, bordered very narrowly on the anterior, and on the posterior margin when viewed from above, more broadly with white pollinose; bristles black. Halteres pale straw colour; spot on thorax above their insertion shining white pollinose.

First four segments of abdomen black; a large dull white pollinose triangular spot on each side of segments 2 and 3, extending backward nearly to the posterior margin, and on segment 2 in a narrowing stripe to the middle of the tergum, thus forming a narrow pollinose cross band on the anterior margin. The fasciæ of segment 3 do not extend so far upward in this specimen; the sides of segment 1 are also somewhat white pollinose. The posterior lateral margins of 2, a fine line on the posterior portion of 3, the entire posterior margin of 4, and segments 5, 6 and 7, entire above, rufous. Pile of tergum short, black, fine, except on the lateral margins of segments 1 and 2, where it is longer.

Venter: segments 2 and 3 dull whitish pollinose; the 4th almost black, the following dark rufous; pile black, sparse on segments 1 and 3, denser and more tufted on the following. Genitalia black above, rufous below, clothed with long whitish pile. Legs everywhere black, except at the femero-tibial articulations, where they are rufous, the thick short pile and bristles black. Claws black, at base rufous; pulvilli straw-coloured. Anterior coxæ with a few whitish and many black bristles; the posterior pair obscurely white pollinose.

Described from 1 male from Indian River, Florida. Type in collection of the American Entomological Society of Philadelphia.

Anisopogon Johnsoni, sp. nov.—Black; head, thorax, scutellum, posterior margins of abdominal segments, venter and legs with dull yellowish-white or whitish pile. Pile, except on posterior margins of abdominal segments, where it is short, recumbent, and often deeper yellow than on the thorax, long, erect, not dense, giving the insect a furry appearance. Face, thinly white pollinose; mystax and vibrissæ composed of long pile, the former dense, mostly black, the latter not as dense, and extending upward to the antennæ on either side of the face in such a way as to leave the middle of the face below the antennæ bare. Occiput white pollinose with long pile; in one male specimen with a few black occipito-orbital bristles. Beard long and fine, palpi small with black and white pile. Proboscis and antennæ black, the style of the latter nearly or quite as long as the third segment. Thorax in several specimens slightly white pollinose beneath the long pile. Abdominal segments finely punctured; the anterior two-thirds of each segment with short black pile, not easily noticeable. Last two segments of female shining black, not punctured; genitalia of male small, reddish, with fine pile.

Legs: coxæ and femora black, with same long pile on thorax. In a few specimens the pile on the upper distal portion of the intermediate and posterior femora short, black; tibiæ and tarsi vary from nearly black to deep testaceous. Pile and bristles of tibiæ moderately long and whitish; bristles of posterior pair in part black; pile extends down over the entire first segment of the anterior, and to a greater or less extent on the first segment of the intermediate and posterior tarsi; the following segments with black bristles. Claws black, pulvilli dark brown. Wings hyaline, veins yellow.

Described from 3 males and 3 females and 10 other specimens for comparison. Seven bear the label of Colorado, and one the date of capture at Fort Collins, September 12, 1901. A pair of co-types deposited in the collection of the Massachusetts Agricultural College, American Entomological Society of Philadelphia, and that of Charles W. Johnson. The paratypes are in the collection of the American Entomological Society.

I have named this species after the well-known dipterologist, Charles W. Johnson, curator of the Boston Society of Natural History, whose aid has been one of encouragement to me.

BEETLE DRIFT ON LAKE MICHIGAN.

BY JAMES G. NEEDHAM.

The ill wind that blows insects into a lake may blow the entomologist some good if he be on hand to collect them when they are cast upon the beach. During recent years I have gathered much material for class use from the drift line upon the beach at Lake Forest, with great economy of time and labour. After every on-shore breeze following sunshiny summer weather some insects are cast up by the waves, and occasionally there is a great accumulation of them. Twice I have observed accumulations of them quite out of the ordinary; the first time, in August, 1899, when the drift was predominantly crickets of a single species (*Nemobius fasciatus*)*, and a second time in June, 1904, when it was predominantly May beetles of a single species (*Lachnosterna fusca*). It is the purpose of this paper to record some observations on this occurrence.

It was discovered on the afternoon of June 11th. The weather had been bright and calm for several days, and the favoring wind was gently blowing from the north-east, and bringing the insects ashore, for the most part alive and in good condition. Two things seemed very remarkable about this drift: first its smell, due to the presence in large numbers of the ground beetle, *Calosoma frigidum*, incited by their tossing upon shore to emit their pungent, but, when sufficiently diluted, not wholly unpleasant odour; and second, the preponderance of beetles. It was nearly all beetles, and nearly all the beetles were a single species. The accumulation was hardly sufficient to be called a windrow—rather, an incomplete layer averaging a meter wide, spread out in a long sinuous line at the farthest reach of the waves—a ribbon of brown trailed along the lighter coloured sand. There was little cinder flotsam or other trash in it, it was nearly pure insect material—brown, because of the millions of May beetles, hardly one per cent. being anything else.

I gathered an abundant supply of Lachnosterna and Calosoma, made a few notes and went home. Early the next morning I went again to the shore, a mile farther northward. There, to my great surprise, I found the beach bare. Had I missed my opportunity by putting off till to-morrow a more careful examination? I walked southward, and soon came upon the smell of it, and then, the drift itself. The wind was still north-east, but insects had apparently stopped coming in. Many of the May beetles,

*An account of this I published in the Occasional Memoirs of the Chicago Entom. Soc., Vol. I., No. 1.

and some others with them, had buried themselves shallowly beneath the sand, and many of the ground beetles were in hiding under loose boards, etc., upon the sand. All were easily discoverable, however, and it is probable that few had left the beach, for none were seen taking flight, and few could be found under loose boards, except near the edge of the water. Hence, I considered the opportunity still favourable for making an estimate of the constituents of the drift. So I selected a representative bit of it a few rods long, and collected and counted all the beetles I could easily find in it, save only *Lachnosterna fusca*, which was innumerable. The result of the count I list below:

Cicindelidæ.

Cicindela hirticollis, Say. (2)

Carabidæ.

Calosoma scrutator, Fabr. (5)
Calosoma frigidum, Kirby. (180)
Calosoma calidum, Fabr. (3)
Amara impunctìcollis, Say. (3)
Amara musculus, Say. (4)
Diplochila laticollis, Lec. (3)
Platynus cincticollis, Say. (1)
Platynus nutans, Say. (1)
Platynus æruginosus, Dej. (1)
Galerita janus, Fabr. (22)
Lebia ornata, Say. (1)
Chlænius tricolor, Dej. (4)
Chlænius tomentosus, Say. (5)
Cratacanthus dubius, Beauv. (2)
Agonoderus pallipes, Fabr. (8)
Harpalus laticeps, Lec. (1)
Bradycellus rupestris, Say. (7)
Anisodactylus nigrita, Dej. (8)
Anisodactylus discoideus, Dej. (1)
Anisodactylus Baltimorensis, [Say. (1)
Anisodactylus sericeus, Harris. (3)

Dytiscidæ.

[The names of the species will be given in a future issue.]

Silphidæ.

Necrophorus Americanus, Oliv. (4)

Cocinellidæ.

Hippodamia convergens, Guer. (1)
Anatis 15-punctata, Oliv. (3)

Byrrhidæ.

Cytilus sericeus, Melsh. (2)
Byrrhus Americanus, Lec. (6)

Lucanidæ.

Lucanus placidus, Say. (23)

Scarabæidæ.

Lachnosterna fusca, Frl. (innumera- [ble)
Cotalpa lanigera, Linn. (10)

Chrysomelidæ.

Diabrotica vittata, Fabr. (1)
Doryphora 10-lineata, Say. (2)

Pythidæ.

Crymodes discicollis, Lec. (3)

Curculionidæ.

Sitones flavescens, Marsh. (1)

Besides beetles there was almost nothing. I saw in all but one Lepidopter—a tiger moth of the genus Eyprepia. Of Hymenoptera there was an occasional bumblebee, wasp or ichneumonid. Of Hemiptera I saw one Belostoma and one Nepa. Of Diptera I saw only craneflies-wings and fragments of single specimens of Symplecta, Gonomyia, Limnobia and Pachyrhina. Of Odonata I saw three specimens each of *Libellula 4-maculata* and *Leucorhinia intacta*. Of other groups I saw none at all. The presence of drowned aquatic species, and the prevalence of large, strong-flying species, were, as usual, obvious features. I followed the drift line more than a mile. It appeared to continue southward indefinitely. Drift lines are not very local ; this is the first time I have seen either end of one.

I will mention in conclusion an accompaniment of the drift that was probably independent of most of the causes that brought the other insects together: This was the copious intermixture of empty pupa-skins of Chironomus. This is the blood worm that lives on the lake bottom. It transforms to a floating pupa, whose skin is left on the surface when the gnat emerges. The wind drifted these skins to the shore, forming a thick, gray scum-like layer of them in the hollows of the shore, overspreading the pier with a layer half an inch thick. The big beetles swam out with their legs draped with these pupa skins, which were inconceivably more numerous than even the Lachnosternas.

White grubs (larvæ of Lachnosterna) are occasionally excessively destructive to blue-grass sod along this "North Shore." In the summer of 1903 I saw acres of beautiful sward with all its roots eaten off two inches below the surface ; it could be rolled up like a carpet ; in places there were a dozen grown larvæ per square foot beneath it. Perhaps these devastating larvæ come from eggs laid by adult Lachnosternas brought in with the drift.

We learn with much pleasure, from *Science*, that MR. SAMUEL HENSHAW, of Cambridge, Mass., has been appointed Curator of the Museum of Comparative Zoology at Harvard University. His only predecessors in the office have been Prof. Louis Agassiz, the founder and first Curator of the Museum, and his son, Dr. Alexander Agassiz. Mr. Henshaw is well known among Entomologists as the author of the valuable "List of the Coleoptera of America, north of Mexico."

MOSQUITO NOTES.—No. 2.

BY C. S. LUDLOW, M. SC.,

Laboratory of the Office of the Surgeon-General, U. S. A., Washington, D. C.

Among the new genera lately separated by Theobald from *Ædes* and *Uranotænia*, the differences seem at times puzzling, and without an opportunity to study the types, it is not always easy to feel sure of the position of a new insect. It is also to be noted that in some of these genera the male is unknown, and it may possibly happen that they belong to the class having long palpi in the male. This is very definitely suggested by a mosquito received recently from Bayamban, Pangasinan, P. I., which, while having long palpi in the male, flat scales (no curved ones) on the head, curved scales only on the scutellum, still has the wing characteristics of *Uranotænia*. From most of the new genera it is cut off by the wing and the long palpus, but it evidently lies near Mimomyia, *if* Mimomyia belongs to the long-palpied group, the main differences being:

1st. The shape of the scales on the mesonotum, which in this insect are, so far as I can determine, simple slender curved scales; more slender than those on *Stegomyia fasciata*, Fabr., but showing no truncated ends.

2nd. Base of 1st submarginal is exterior to that of 2nd posterior.

3rd. Position of cross-veins, which in this insect are typical *Uranotænia* veins.

Variability of cross-veins has, however, now become proverbial, and while the other differences constitute good specific values, they hardly seem, even considering the scale shapes on the mesonotum, sufficient to warrant creating a new genus, and I am therefore placing it, provisionally at least, under *Mimomyia*.

Mimomyia Chamberlaini, n. sp.—Male: head light, heavily covered with light yellow, almost white iridescent flat scales, a few brown forked scales on the occiput extending well around to the sides; two large bristles projecting forward between the eyes, four or five around the eyes; antennæ brown, very plumose, light banded, basal joint bare, dark, verticels brown, but giving light (tow-coloured) reflections with a suggestion of orange; proboscis orange, tip black; palpi longer than the proboscis, mostly yellow-scaled ventrally, but partly brown-scaled dorsally, a dark band at the apex of the penultimate joint, and the ultimate joint clubbed (suggesting some of the *Anopheles*), and quite dark at the tip; clypeus yellow; eyes brown and silver.

Thorax: dorsum dark brown, heavily covered with dark brown slender curved hairs, laterally light, covered with light golden curved scales, forming a large spot over and around the wing joint, and running in a line cephalad on the edge of the mesonotum, light bristles over the wing joint; pleura and prothoracic lobes almost white; scutellum, dark brown median lobe, and light lateral lobes, both covered with dark brown slender curved scales, six large and a few small bristles on the mid-lobe, four bristles on the lateral lobes; metanotum dark brown.

Abdomen light, thickly covered with dark brown flat scales, having deep blue iridescence; very large basal lateral light spots forming an almost continuous lateral yellowish stripe, also continuous with the venter, which is very light yellow, almost white. All the segments heavily haired.

Legs: coxæ and trochanters all light. In the fore legs the femora are brown dorsally and ventrally light yellow, growing darker toward the apex, tibiæ brown (giving red-bronze and purple lights), metatarsi brown, with tiny light apical bands, tarsal joints brown, the first and second also with light apical bands. Ungues unequal, very large, one bi-serrate and the smaller almost straight. Mid-legs much as in fore legs; there are tiny light bands on the metatarsi, and first and second tarsal joints, and in some lights the whole metatarsus looks light. Ungues as in fore legs. Hind legs have femora brown, with red reflections, tibiæ brown, with light apical bands. There are also narrow apical bands on the metatarsi and first and second tarsal joints, the remainder of the hind legs is missing. In some cases the bands seem slightly to involve both joints, but in any case they are minute.

Wing light, and apparently partly denuded, but there are rather broadly truncated, sometimes slightly asymetric dark scales, with dark blue-green iridescence on costa, subcosta and 1st long vein and a few of the same "broad-ended" scales on the other veins; 1st submarginal cell is about one-third longer and a third narrower than the 2nd posterior, the base of the latter, however, being well interior to that of the 1st submarginal. Stem of 1st submarginal about one-third longer than the cell, and somewhat longer than that of the 2nd posterior. Mid cross-vein is about same length as supernumerary, which it meets, and posterior cross-vein is about one-fourth longer, and is distant from the mid about three-fourths of its own length. Halteres light, knob brown scaled. Length, 4-5 mm.

Habitat: Bayamban, Pangasinan, Luzon, Philippine Islands. Taken May 15.

Described from one specimen collected by Capt. W. P. Chamberlain, Asst. Surg., U. S. A., after whom it is named. In the same collection were *Culex microannulatus*, Theob.; *C. gelidus*, Theob.; *C. annulifera*, Ludlow; *Mansonia annulifera*, Theob.; *Myzomyia Ludlowi*, Theob.; *Myzomyia Thorntonii*, Ludlow; *Stegomyia scutellaris*, Walker; and *Myzomyia Rossii*, Giles, var. *indefinata*, n. v., Ludlow, an unusually large number of species for one collection.

As another instance of variation, I have received during the last year, from different parts of the P. I., specimens of a *Myzomyia* apparently new, yet lying so close to *Rossii* and *Ludlowi* that it has been difficult to be sure just where they belong. The differences hardly seem to be specific, and are, besides, most of them very unstable, and after much hesitation I have decided to publish it as a variety of *Rossii*.

Myzomyia Rossii, Giles, var. *indefinita*, n. v.—Female: Head brown, covered with white curved scales on the vertex, some large ones projecting forward as a white tuft between the eyes, white forked scales on the occiput, brown on the sides; antennæ brown, verticels and pubescence white, basal joint testaceous; palpi brown, last joint broadly white tipped, a narrow white band near it, and another dividing the remainder of the palpus in half (very like *Ludlowi*), basal part dark and quite heavily scaled; proboscis dark, tip light; eyes brown; clypeus brown.

Thorax gray and sparsely covered with slender hair-like curved white scales, and a few heavier ones projecting forward at the neck, a dark median line, widening just cephalad of the scutellum so as to form a small spot, narrow lateral ridges appearing as dark lines, running from the scutellum about half the length of the mesothorax; scutellum with hair-like white scales; metanotum brown; pleura gray, with brown spots almost forming bands.

Abdomen gray, densely covered with golden hairs.

Legs: coxæ and trochanters white, scaled with dark tips so as to form a light band at base of leg; femora all brown, a subapical yellow band on the fore femora, the tip dark; this marking sometimes occurs on the other legs and sometimes is wanting on all; tibiæ brown, with a narrow apical yellow band; metatarsi the same; tarsi on fore and mid-legs basally and apically banded except the last joint, which lacks the apical

band; ungues simple and equal. The metatarsi and tarsi on the hind legs have usually only minute apical bands, but occasionally the tarsal bands involve both joints.

Wings light, heavily covered with dark and light scales, forming on the costal portion spots as follows: Apex light, extending on tip of 1st long. and upper branch of 2nd long., then a short dark spot, which includes 1st long. and upper branch of 2nd long., followed by a light spot, about one-third longer than the dark, and extending also on 1st long.; second dark spot about as long as the preceding one, and extends on 1st long.; then a light spot followed by the third dark spot, which is much the longest of the dark spots, includes the sub-costa its full length, and extending on the 1st in the centre, suggests the "T" of *Rossii*; there is also at times a second dark spot on the 1st long. under this long one (like the marking in *Ludlowi*), and the relative lengths of all the costal spots vary so much that no measurements can be depended on. The fourth spot is shorter again, and extends on the sub-costa and 1st long. A couple of small indefinite dark spots on the costa only at the base of the wing. The wing field reminds one strongly of *Ludlowi*, and is fairly stable; 1st submarginal is slightly longer and about the same width as the 2nd posterior cell; bases nearly on a line, and the cells are noticeably longer than those in *Ludlowi*, in which this species resembles *Rossii*. Supernumerary cross-vein about half the length of the mid, which it meets, and posterior cross-vein is also about the same length, and about two and one-half times its length from the mid. Halteres light, knob fuscous. Fringe mottled, light at apex of cells. Length, 3.5 mm.

Habitat: Philippine Islands. Taken May (Bayamban), Sept. (Mangarin), Dec. (Guimaras Is.), etc.

This species occurs with *Ludlowi* at various places, and until Mr. Theobald called my attention to the differences I believed it to be *Rossii*, which it strongly resembles. The general colouring is, however, darker in this resembling *Ludlowi*, and its great variability makes it extremely hard to place definitely. Its relationship to these two species may be indicated as follows:

Wing venation like *Rossii*, and is constant. Palpal markings and general colour like *Ludlowi*, also constant. Femoral markings (when present) like *Rossii*, never like *Ludlowi*. Wing markings extremely variable, and may resemble either species. The balance seems to lie in favour of *Rossii*, and I have therefore referred it to that species.

In my "Mosquito Notes"* I referred to *Culex tæniorhyncus*, Wied., as not having been found, so far as I knew, north of Florida. The mistake was caused by my being so impressed with the statement (Theobald's Monograph, Vol. I., pp. 352, 353, 1901), "Mr. Coquillett writes me this species is not found north of Florida and Mexico," that I did not even consult American authorities. This statement is, of course, superseded by later work, and the species is found in the vicinity of Washington, D. C., in Pa., and in N. J., etc., as shown by various authorities, notably the interesting work on *C. tæniorhyncus* and *G. sollicitans*, by Dr. J. B. Smith, of N. J., to whom, as to others, my apology is due. This is another very variable species. Dr. Smith writes me that those he finds show much variation as to abdominal markings, but that the leg maculation is constant; those sent me from Florida and N. C., while fairly stable as to abdominal markings, are not constant as to the band on the proboscis, it being at times hardly more than a dot, while the last tarsal joint of the hind legs shows all variations from pure white to almost pure brown, the two legs on the same insect being often quite unlike. Mr. Coquillett tells me he also finds these differences in the specimens sent him.

NOTES ON SOME BEES IN THE BRITISH MUSEUM.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Spending the summer in England, I have, of course, hastened to examine the types of F. Smith, and other bees contained in the collection of the British Museum. The following notes elucidate some species which had puzzled American entomologists, who had access only to the descriptions:

Chelostomoides rugifrons (Smith).

Chelostoma rugifrons, Sm., type ♀.—Would be large for *Chelostoma*; a transverse ridge, with large punctures, below the antennæ, and below this a smooth shining impunctate depressed area, bounded on each side by a vertical ridge, so that one gets the impression at first that the clypeus is very broadly and deeply emarginate; the long labrum, seen from above, looks like the end of an elephant's trunk, being broadened at the end, and presenting a median elevation; the "tooth near the base within" of the mandibles is a shining tubercle; the recurrent nervures join second submarginal cell at about equal distances from its base and apex respectively; the basal nervure just fails to reach transverso-medial; claws

*CANADIAN ENTOMOLOGIST. Aug., 1904, p. 236.

broad and angled basally, but not cleft; no pulvillus (*Chelostoma florisomne* has a large pulvillus); first abdominal segment with a distinctly margined though shallow concavity.

Emphoropsis cineraria (Smith).

Anthopora cineraria, Sm., ♀.—Easily known by its rather large size and grayish appearance, rather like a large *Clisodon terminalis*; hair on outer side of hind tibiæ entirely shining orange-golden; hair on sides of face is black, and black hair is mixed with that of mesothorax; the venation is of the type of *E. floridana*, marginal cell comparatively long, and recurrent nervures entering it at ends of second and third submarginal cells, though not meeting transverse cubital nervures; third submarginal cell strongly contracted above. The male has a white clypeus, very broadly margined laterally with black; the white area is broader than long, and is a curious sort of pinkish-white.

The Mexican species of *Emphoropsis* (placed by Smith in *Habropoda*) represent a distinct section of the genus, known by the light area on the clypeus being much longer than broad, and separated from the lateral face-marks. Our *E. floridana* differs also from the Mexican ones by its much broader face, with a broader and shorter clypeus. The Mexican *E. agilis* has maxillary palpi slender, 6-jointed, second joint longest, last two small; paraglossæ short; galea long and parallel-sided, as long as labial palpi. Male with third antennal joint not elongated, though its apical half is broadened. The second joint of maxillary palpi is much longer than first, but not as long as the last three together. The Mexican species are readily separated, thus:

Pubescence of thorax black ..... *Emphoropsis terminata* (Smith).
Pubescence of thorax not black ..... 1.

1. Ground-colour of abdomen red ..... *E. agilis* (Sm.).
   Ground-colour of abdomen black or largely so ..... 2.
2. Pubescence of thorax bright orange-fulvous, anteriorly with black hairs intermixed ..... *E. fulva* (Sm.).
   Pubescence of thorax without black hairs intermixed ..... 3.
3. Pubescence of thorax light yellowish; clypeus without black marks on the yellow; apical part of abdomen not red .. *E. montezumia* (Sm.).
   Pubescence of thorax bright orange-fulvous; clypeus with two black streaks on the yellow; apical part of abdomen with red ground-colour ..... *E. bombyformis* (Sm.).

Perdita halictoides, Smith.

Type: Abdomen very dark brown, almost black; nervures and stigma sepia, strongly defined; marginal cell with the poststigmatal part hardly as long as the substigmatal; metathorax and sides of thorax dark blue, but the prothorax, mesothorax and scutellums practically black, tinged with aeneous; face more or less greenish, with no light marks; mandibles fulvo-ferruginous, scape reddish; legs dark brown, femora darker. Nearest to *P. æneifrons*, Ckll.

Pseudopanurgus andrenoides (Smith).

Scrapter andrenoides, Sm., type ♀.—Rugose, with pale fuliginous wings, head and thorax almost nude; marginal cell truncate; stigma large, brown; first recurrent nervure enters second submarginal cell a long way from its base; second recurrent joins cell at its extreme tip; basal nervure falls short of transverso-medial by a moderate distance; maxillary palpi 6-jointed; first joint of labial palpi somewhat shorter than the other three united; facial foveæ club-shaped in outline, smooth and shining; no raised nodule on vertex; process of labrum broadly truncate; mandibles reddened; clypeus densely punctured, except a narrow median line; punctures of mesothorax minute and extremely numerous, though quite distinct; the abdomen has not the large coarse punctures of some forms of *Pseudopanurgus;* tegulæ shining testaceous; basal half of the abdomen with a strong reddish tinge; hind legs slender; hind tibial scopa thin but abundant. The truncation of the marginal cell is not nearly so oblique as in *Panurginus Cressoniellus*.

Nomia fausta (Smith).

Andrena fausta, Sm., type ♀.—Natal. Third submarginal cell at least as large as first; enclosure of metathorax practically reduced to a transverse band; head and thorax with very dense large punctures; basal joint of hind tarsi with the apical margin very oblique, second joint triangular; tegulæ with a little keel behind. Colours like those of *Nomia rubella*, Sm. Also examined by Col. Bingham, who agrees with me that it is a *Nomia*.

Prosopis.

♂.

Supraclypeal mark well developed; lateral face-marks extending upwards along eye-margin; scutellum yellow ..... 1.

1. Marginal cell and beyond fuliginous; sides of clypeus, except basally, narrowly margined with black (Mexico)..... *maculipennis*, Smith.

Marginal cell not clouded; sides of clypeus not marginal with black (S. Paulo, Brazil) ..... *rugosa*, Smith.

♀.

Lateral face-marks continued upwards along eye-margin; clypeus with a broad central yellow stripe.. ..... 1.

1. Scutellum black (Brazil) ..... *variolosa*, Smith.
Scutellum yellow..... ..... *vigilans*, Smith.

Prosopis trepanda, Smith, is a synonym of *vigilans*.

Gastropsis.

Ashmead puts this in the Andreninæ, but it is really a relative of *Meliturga*, and has, like it, terminal abdominal spines in the ♂, and the same sort of eyes (though in *Meliturga* ♂ they converge above) and the same third antennal joint. They also agree in having the basal nervure falling a long way short of the transverso-medial. They are, of course, quite distinct genera, *Meliturga* being the more aberrant. *Oxæa* also appears to be related.

Gastropsis pubescens, Sm., ♂.

W. Australia; the only known species of the genus. Its general appearance is very like that of the Peruvian *Megacilissa vestita*, Smith, but the venation, of course, is different. It has the broad second submarginal cell like that of *Anthoglossa plumata*, Sm., and like it has the stigma obsolete. First and second recurrent nervures enter middle of second and third submarginal cells; third antennal joint very long; face narrow, with large eyes; maxillary palpi 6-jointed; area of metathorax very long and narrow; abdomen very hairy, and rather tapering, with two terminal spines, which are sometimes folded back, and then not readily seen.

Sphecodes dichroa, Smith.

Type ♀. Vertex with a low but quite observable tubercle just behind the ocelli, and behind this are a number of transverse grooves or striæ; mesothorax with large strong punctures well separated on a shining surface; abdomen with distinct but only moderately close punctures, only the last segment blackish; area of metathorax strongly but not closely longitudinally wrinkled, and with some irregular cross-wrinkles.

Sphecodes pilosulus, Smith.

Type ♀. Mandibles dentate; metathoracic area semilunar, very distinct, with a strong margin, and very strongly, closely longitudinally ridged; rest of metathorax hairy; face hairy; first abdominal segment with a black discal patch.

Sphecodes mandibularis, Cresson.

An apparently authentic ♀ in the Museum has the mandibles dentate.

A NEW GENUS OF SPIDERS.

BY THEO. H. SCHEFFER, A.M., MANHATTAN, KANS.

Family Thomisidæ: Subfamily PHILODROMINÆ.

Philodromoides, gen. nov.—Cephalothorax low, about as wide as long; head region much narrowed and slightly elevated. Abdomen fully twice as long as wide, very little wider behind than at the base; somewhat pointed at the end; the base projects a short distance over the cephalothorax, and is distinctly notched on the upper side. The sternum and labium are about as in *Philodromus*. All eyes approximately equal in size; the anterior row much the shorter and slightly recurved; median eyes of this row farther from each other than from the side eyes. Posterior row also recurved; side eyes of this row on larger tubercles than any of the others; median eyes farther from each other than from the side eyes. Ocular quadrangle considerably wider behind; about as wide as long. Clypeus wider than space between anterior median eyes, but not as wide as space between posterior median eyes; obliquely directed forward and downward. Legs long and slender, the second pair longest, the third shortest; the relative lengths are, in their order, second pair, first pair, fourth pair, third pair. The tibiæ of the first and second pairs are set beneath with ten or twelve stout spines arranged in two rows, and the metatarsi are similarly armed with half that number. Weaker spines likewise occur on the other two pairs of legs and on the pedipalps.

FIG. 8.

Philodromoides prataria, sp. nov.—Female. Length, 6 mm.; length and width of cephalothorax, 2 mm.; width of abdomen, 2 mm. Other characters as given in the generic description. A very few short bristle-like hairs scattered about among the spines on the outer joints of the legs and on the chelicerae and the pedipalps; thickest on the tarsi of the latter.

Coloration.—Abdomen plain brown above, mottled and streaked with a lighter shade. The four muscle impressions are quite distinct. Cephalothorax rusty-brown, lighter at the sides and just back of the head region. Streaks marked by depressed lines radiate from the dorsal groove. The sternum is pale yellow or almost white. The abdomen is lighter beneath than above, and there is a less mottled central region, set off by a row of indistinct dots on either side. The legs are pale yellow to whitish. The femora, patellæ and tibiæ of all four pairs are marked in front with a longitudinal stripe of black, which becomes nearly obliterated on the metatarsi and tarsi. The corresponding joints of the legs of the third and fourth pairs are similarly marked on the hind border also.

The males are somewhat smaller than the females, the abdomen being considerably narrower than the cephalothorax. The legs are more hairy in appearance and the spines less conspicuous than in the female. The colour markings are about the same in the two sexes.

This species is not uncommon about Manhattan, Kansas, in mid-summer. Mature males and females were taken in this locality on August 17. Types are in the collection of the Kansas State Agricultural College and in the National Museum at Washington.

A NEW PROTEOPTERYX.

BY W. D. KEARFOTT, MONTCLAIR, N. J.

PROTEOPTERYX WILLINGANA, sp. nov.

♂, 18 mm. Head, thorax, palpi, antennæ and fore wings, same shade of very light tan or pale brownish-fuscous, overlaid with a few blackish brown scales.

Palpi: outer joint short, obtusely pointed; tuft on second joint flattened and appressed, lower scales extending to outer end of outer joint. Head roughly scaled. Eyes black with coppery reflection. Antennæ annulated with fuscous and brown. Thorax smooth.

Fore wing: just beyond base, above and below fold five small clusters of dark scales in an irregular ring, open towards base. A broad oblique central fascia is faintly outlined by two very scattering lines of dark scales, the inner from inner quarter of costa to inner third on dorsum, and the outer from middle of costa to dorsum before angle. Regularly and closely placed on costa are small clusters of dark scales, in short oblique dashes on the inner half, and short oblique lines on the outer half. A small subapical dark spot, and below it a submarginal cloud of darker scales between the latter and outer margin, obscurely merging into central fascia. The lower two-thirds of margin are almost entirely free from dark scales, and are of a pale yellowish-fuscous colour, except the ocellic spot above angle, which is white, overlaid with gray. Cilia same as fore wing, but slightly darker.

Hind wing pale fuscous, with darker fuscous scales below outer half of costa and at apex. Cilia same. All the space above vein 8 is closely and heavily clothed with rather short black scales; this is possibly a sexual character. Abdomen grayish-fuscous, anal tuft bright light brown. Legs yellowish-fuscous, shaded with light brown.

♀, 18 to 20 mm. Three specimens, each differing from each other only in degree of darkness, and differing from the male in the absence of the black subcostal streak on hind wing and in the addition of four clusters of raised scales on the fore wing, three subdorsal, evenly spaced, inner just beyond base and outer before angle, the fourth is above and beyond the latter.

Fore wing of palest ♀ contains less black scales than ♂ described above, and the lines indicating the central fascia are almost obsolete. There are three short parallel horizontal dark lines on outer margin below apex, and a fourth below them traversing the ocellic spot. White scales are rather freely scattered over the fore wing of this specimen, which under a low-power lens or with eye only, appears almost immaculate, of a pale tan colour, with basal area, a broad oblique band beyond central fascia and cilia a shade darker.

The markings on fore wing of darkest ♀ are well defined. The ground-colour is white and whitish-fuscous, with streaks and spots of yellowish-tan. The black scales are arranged as follows: A short vertical streak just beyond base connects by a line in the fold to a parallel vertical streak inclined inwardly, neither touching dorsum. A rather large

SPINNING HABITS OF TELEA POLYPHEMUS.—Prof. F. M. Webster writes, with reference to his article in the May number, page 133: "The observations of Mr. Cockle (C. E., p. 100, May) are not altogether unique, as Mr. Wm. T. Davis, in the Journal of the N. Y. Entomological Society, Vol. V., pp. 42–43, records having observed a cocoon of *Telea polyphemus* attached to the side of a house, in August, about 5 inches from the ground, and also a case where a larva had spun in the forked branch of a rose-bush that had stood in the water; in both cases the cocoons were firmly attached. The same writer records the finding of a Luna cocoon spun on, and firmly attached to, the branch of a tree or shrub that had stood in the water. It thus appears that these insects do the best they can under existing circumstances, and I presume Mr. Cockle, had he been able to see the conditions when the cocoons to which he refers were spun, might also have noticed that these were unusual." [Mr. Cockle sent to the Annual Meeting of the Entomological Society of Ontario a further paper on this subject, and a quantity of cocoons showing a remarkable variety of modes of attachment, some being suspended in the same manner as *C. promethea*.—ED. C. E.].

NOTES.

MR. F. L. WASHBURN, State Entomologist of Minnesota, reports the occurrence at St. Anthony Park of the imported Alder and Willow Beetle, *Cryptorhyncus lapathi*, Linn., which was introduced in a shipment of Carolina poplars from the State of New York last spring.

MR. K. JORDAN, Zoological Museum, Tring, England, desires to draw attention to the fact that *Hyloicus* [*Sphinx*] *perelegans* has a gray form very similar to a small *H. chersis*, besides the ordinary black-backed form. Perhaps someone will breed the insect and thus ascertain whether the dichromatism is seasonal.

The Curator begs to acknowledge with grateful thanks the following gifts to the Society's collections:

From Mr. C. H. Young, Hurdman's Bridge, Ont., specimens of the imago, chrysalis and inflated larvæ of *Semiophora Youngii*, Smith, and a new species of *Hydræcia*.

From Mr. A. A. Wood, Coldstream, Ont., specimens of *Ancyloxypha numitor*, Fabr., *Orthosia helva*, Grote, and *Botis generosa*, Grote and Rob.

The Curator would very much like to receive specimens of most of our Canadian insects to fill blanks in the cabinets, and to replace old and imperfect examples; all specimens should have date and locality labels attached. In many of the orders our collections are very meagre. To avoid duplication it would be well for any intending donor to send a list first of those specimens which he is willing to present to the Society.

Mailed Nov. 8th, 1904.

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[illegible] correspondents who will collect Cicindelidæ [illegible] Coleoptera of Mexico, Central and South America, Europe and [illegible] Write offers to Zoological Museum, 37 Zool. Bldg., University of Chicago, Chicago.

[illegible] Lepidoptera of Canada, in papers with data, in exchange for British Lepidoptera in papers with data, during the coming season. Acidalidæ and Plusiidæ especially wanted. LIEUT.-COL. SWINHOE, Wycliffe Lodge, Wimbledon Common, Surrey, S.W. England.

The Canadian Entomologist.

VOL. XXXVI. LONDON, DECEMBER, 1904. No. 12

NOTES ON THE LOCUSTIDÆ OF ONTARIO.

BY E. M. WALKER, B. A., M. B., TORONTO.

(Continued from page 330.)

Sub-family *CONOCEPHALINÆ*.

7. CONOCEPHALUS ENSIGER, Harris. The Sword-bearer.

Conocephalus ensiger, Harr. Ins. Inj. Veg., 1862, 163.

Measurements: Length of body, ♂ 26.5 mm., ♀ 29 mm.; of pronotum, ♂ 7.5 mm.; ♀ 6.7 mm.; of hind femora, ♂ 20.5 mm., ♀ 21.5 mm.; of tegmina, ♂ 41 mm., ♀ 46 mm.; of ovipositor, 32 mm.

This is a very common insect in Ontario, ranging northward about as far as Muskoka and the Bruce Peninsula. It frequents fields, vacant lots and roadsides, which resound at night with the incessant monotonous song, during late summer and autumn.

Scudder describes this song as composed of a succession of sounds like "*chwi*," emitted at the rate of about five per second. He states that it stridulates only at night or during cloudy weather, but I have occasionally heard it in bright sunshine, in the afternoon. It is the most easily approached of all our locustarians while thus engaged, and is in fact difficult to find in any other way; hence the females are but seldom seen.

Although this grasshopper usually perches upon tall weeds, I have occasionally traced its song to a tree or vine, the insect being sometimes stationed at a considerable height.

I have taken but one brown individual, a female captured at Toronto, Oct. 1, 1893.

Localities: Rondeau, Kent Co., Sept. 14, 1899; Leamington, Aug. 7, 1901; Sarnia, Aug. 16, 1901; Goderich, Aug. 19, 1901; Burke Id., Lake Huron, Aug. 27, 1901; Niagara River, Sept. 26, 1898; Toronto, Aug.–Nov.; Lake Simcoe, Aug.–Sept.; Bracebridge, Muskoka (heard), Sept. 11, 1900.

8. CONOCEPHALUS NEBRASCENSIS, Bruner. The Nebraska Conehead.

Conocephalus Nebrascensis, Bruner, CAN. ENT., XXIII., 1891, 72.

Measurements of ♂: Length of body, 25 mm.; of pronotum, 6.5 mm.; of hind femora, 19 mm.; of tegmina, 34 mm.

I found four males of this species at Sarnia, on the 12th of August, 1901, by tracing the song to its source. The song was a loud, penetrating, continuous whirr, quite suggestive of the dog-day Cicada, but less clear, and very unlike that of *ensiger*. It was heard in the morning during bright sunlight.

The specimens were taken in a large stretch of open grassy marsh land, bordering the St. Clair River. Earlier in the season this area of land had been entirely covered by water, but the ground was dry when I visited the spot.

9. XIPHIDIUM FASCIATUM, De Geer. The Slender Meadow Grasshopper.

Locusta fasciata, De G., Mem. pour serv. à l'hist. des ins., III., 1773, 458.

Xiphidium fasciatum, Burm., Handb. der Ent., II., 1839, 708.

Measurements: Length of body, ♂ ♀ 12.5 mm.; of pronotum, ♂ 2.75 mm.; ♀ 2.8 mm.; of hind femora, ♂ 11 mm., ♀ 11.5 mm.; of tegmina, ♂ 14 mm., ♀ 15 mm.; of ovipositor, 8.4 mm.

This is much the most abundant locustid found in Ontario, and is common in every part where I have made collections of Orthoptera. It is especially numerous in low damp pastures, timothy and clover meadows.

My earliest captures are dated July 25th, but the imagoes usually appear rather before this. They remain until the beginning of October.

The song of the male is somewhat like a faint echo of that of *Orchelimum vulgare*, but the "*zip*" is emitted only once or twice at a time, and at shorter intervals, "*xr..... zip, zip, xr.....*"

Fasciatum is one of the few common locustids in northern Ontario. It is as abundant at North Bay, Lake Nipissing, as at Point Pelee, and south of the boundary line its range extends to Buenos Ayres, S. A.

Localities: Ottawa; Ont., generally to north of Lake Superior (Caulf.); Point Pelee and Leamington, Aug. 8, 1901; Arner, Essex Co., Aug. 9, 1901: Rondeau, Sept. 14, 1899; Chatham, Aug. 10, 1901; Sarnia, Aug. 12, 14, 1901; Walpole Id., River St Clair, Aug. 13, 1901; Goderich, Aug. 19, 1901; Southampton, Aug. 22, 29, 1901; Bruce Peninsula, Aug. 23, 27, 1901; Toronto, Aug.–Oct.; Lake Simcoe, July 29–Oct.; Severn River, Aug. 17, 1898; near Gravenhurst, Aug. 27, 1899; Algonquin Park, Aug., Sept., 1902, '03; North Bay, Sept. 12, 1900; Whitemouth, north shore of Lake Superior, Aug. 28, 1897.

Outside of Ontario I have taken this species at Quebec and the Isle d'Orleans, P. Q.; Aug., Sept, 1904; Boissevain, Man., Sept. 24, 1897; and at Agassiz, B. C., Sept. 9, 1897.

10. XIPHIDIUM BREVIPENNE, Scudd. The Short-winged Meadow Grasshopper.

Xiphidium brevipenne, Scudd., Can. Nat., VII., 1862, 285.

Measurements: Length of body, ♂ 12 mm., ♀ 13 mm.; of pronotum, ♂ 2.75 mm., ♀ 3.25 mm.; of hind femora, ♂ 10.3 mm., ♀ 11.7 mm.; of ovipositor, 9.75 mm.

This is another abundant species in Ontario, and is found in the same places as *X. fasciatum.*

It first reaches maturity about the first week in August, and remains well into October.

Although nearly as common as *X. fasciatum* in southern Ontario, *brevipenne* becomes scarcer to the north of Muskoka. It was not very common in Algonquin Park, where it seems to prefer the vicinity of rank herbs and bushes in more or less shady spots; while at North Bay I did not come across it at all. It was also quite rare on the Bruce Peninsula. On the other hand, I found it very abundant on the Isle of Orleans and surrounding parts of the Province of Quebec, *fasciatum* being comparatively scarce there.

The note of the male is very like that of *fasciatum.* The *zips* are emitted at intervals of about one second, one or two being produced at a time.

I have a long-winged female of a *Xiphidium* taken at Rondeau, Sept. 15, 1899, which possibly belongs to this species. It is considerably larger than typical *fasciatum*, with a distinctly longer ovipositor. In the length and shape of the ovipositor, it is very like *ensiferum*, but the head and pronotum are narrower than in that species. It measures as follows: Length of body, 15 mm.; of pronotum, 3 mm.; of hind femora, 13 mm.; of tegmina, 8 mm.; of ovipositor, 12.3 mm.

Localities: Arner, Essex Co., Aug. 9, 1901; Rondeau, Sept. 14, 1899; Sarnia, Aug. 12, 1901; Walpole Id., River St. Clair, Aug. 13, 1901; Goderich, Aug. 19, 1901; Southampton, Aug. 22, 1901; Tobermory, Bruce Co., Aug. 26, 1901 (one seen); Burke Id., Lake Huron, Aug. 27, 1901; Owen Sound, Aug. 31, 1901; Toronto, Aug. 4–Oct.; Lake Simcoe, Aug. 5 to Oct.; Severn River, Aug. 17, 1898. Six-mile Lake, Muskoka, Aug. 24, 1898; Dwight, Northern Muskoka, Sept. 2, 1902; Algonquin Park, Aug., '02, '03.

11. XIPHIDIUM SALTANS, Scudd.

Xiphidium saltans. Scudd., Rep. U. S. Geol. Surv., Nebr., 1871, 249.

Xiphidium modestum, Brun., CAN. ENT., XXIII., 1891, 56.

Measurements: Length of body, ♂ 11 mm.; ♀ 12 mm.; of pronotum, ♂ 2.8 mm., ♀ 3 mm.; of hind femora, ♂ ♀ 10 mm.; of tegmina (short-winged form), ♂ 4 mm.; ♀ 2.4 mm.; of ovipositor, 10.6 mm. Long-winged form: Length of tegmina, ♂ 14 mm.; ♀ 14.6 mm.; of wings, ♂ 16.2 mm., ♀ 17 mm.

I have found this western species in but one locality, High Park, Toronto, where it occurs locally in considerable numbers in the open grassy uplands, on sandy soil. These sandy uplands are of a very interesting character, and support a number of unusual plants and insects. Among the latter, *Melanoplus Dawsoni*, another western grasshopper, is found in the same spots as *X. saltans*. Both of these species are characteristic of the Western prairies, the general range of *saltans*, as given in Scudder's "Catalogue of the Orthoptera of the United States and Canada," being from the Rocky Mts. to the Mississippi River. It is found in the western part of Indiana, and has been reported from New Jersey (Smith. Ins N. J., 1900, 162).

X. saltans is most plentiful in tufts of rather long grass. New Jersey Tea, Sweet-fern and Lupine are among the characteristic plants of the locality.

My specimens are all peculiar in their coloration, being of a pale, almost bluish green, instead of dull reddish brown, the usual colour according to the descriptions. The dark stripe on the top of the head and pronotum is margined on either side by a very distinct and rather broad yellowish line.

A pair of this species was submitted to Prof. Morse, and another to Prof. Blatchley, both of whom agree in confirming my determination.

On the 9th of August, 1903, I captured a pair of long-winged individuals. These are the first that have been taken. They were found in company with short-winged examples, and are recognizable as *saltans* at a glance from the small size, peculiar coloration and long ovipositor in the female.

My specimens are dated Aug. 9, 10, 1902, and Aug. 9, Sept. 8, 20, 1903.

12. XIPHIDIUM NIGROPLEURA, Bruner. The Black-sided Meadow Grasshopper.

Xiphidium nigropleurum, Brun., CAN. ENT., XXIII., 1891, 58.

Xiphidium nigropleura, Scudd., CAN. ENT., XXX., 1898, 184.

Measurements: Length of body, ♂ 19.3 mm., ♀ 14.6 mm.; of pronotum, ♂ 3.3 mm., ♀ 3.5 mm.; of hind femora, ♂ 13 mm., ♀ 13.8 mm.; of ovipositor, 17.5 mm.

I have come across this handsome species in small numbers in southern Ontario, where it frequents open marshes bordering creeks and ponds, and grown up with tall grasses, sedge, etc. It was generally found in company with the next species. But a single male was taken.

Localities: Rondeau, Sept. 14, 1899; Arner, Aug. 9, 1901; Chatham, Aug. 10, 1901; Walpole Id., River St. Clair, Aug. 13, 1901.

13. XIPHIDIUM ATTENUATUM, Scudd. The Lance-tailed Meadow Grasshopper.

Xiphidium attenuatum, Scudd., Trans. Amer. Ent. Soc., II., 1869, 305.

Xiphidium Scudderi, Bl., CAN. ENT., XXIV., 1892, 26.

Measurements: Length of body, ♂ 12 mm., ♀ 14 mm.; of pronotum, ♂ 2.6 mm., ♀ 2.9 mm.; of hind femora, ♂ 11 mm., ♀ 14.2 mm.; of tegmina, short-winged form, ♂ 9.5 mm., ♀ 8.5 mm.; long-winged form, ♂ 16.5 mm.; ♀ 19 mm.; of ovipositor, 20–30 mm.

This extraordinary insect is plentiful in southern Ontario, but is quite limited in distribution.

The females are easily known by the enormous development of the ovipositor.

It frequents open marshy borders of creeks and ponds, where it leaps about with wonderful agility among the tall grasses and sedge. The short-winged form is much more often seen than the long.

Blatchley says: "The eggs of *attenuatum*, as the length of the ovipositor indicates, are laid between the stems and leaves of tall rank grasses, among which the insects live."

Localities: Rondeau, Sept. 15, 1899; Point Pelee, Aug. 8, 1901; Walpole Id., River St. Clair, Aug. 13, 1901.

(To be continued.)

A REVIEW OF OUR GEOMETRID CLASSIFICATION—No. 2.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

In my former paper a preliminary discussion of certain genera in Geometridæ made plain the need for a general rearrangement of this group. But this cannot be done as regards all of the species without much close study and comparison of types. Therefore, I venture at this time only to outline what seems to me the most rational method of arrangement into sub-families and genera—to include new material and to correct many errors in definition, and in some cases identification of generic types, as given by Dr. Hulst (Trans. Am. Ent. Soc., xxiii., 245, 1896). I claim nothing original in my work, for I consider the general scheme, as devised by Dr. Hulst, the best that can be produced, nor do I need to add to his introduction of it, as given in the article referred to, except to say that I am strongly in accord with him when he states that this family are most nearly related to the Noctuidæ. In my arrangement of genera I place, therefore, *Paleacrita* at the head of the series.

Following largely the characterization as given by Dr. Hulst, they separate thus:

Geometrina.

Synopsis of families and sub-families.

Hind wings, vein 5 present, strong.....Geometridæ.
Hind wings, vein 5 absent, or a fold only.....Ennomidæ.

Geometridæ.

1. Antennæ ♂ unipectinate.....Monotaxinæ.
   Antennæ ♂ not unipectinate.....2.
2. All wings with vein 5 nearer 6 than 4.....Geometrinæ.
   Fore or hind wings with vein 5 at middle of cell or nearer 4 than 6..3.
3. Hind wings, vein 8 coalescing with cell to middle, or if separate, joined with it by a cross-bar, at or beyond middle.....Hydriominæ.
   Hind wings, vein 8 separate from cell, or joined at or near base only.4.
4. Hind wings, 8 shortly joined with cell at or near base.....5.
   Hind wings, 8 separate from cell.....Brephinæ.
5. Hind wings, 8 joined with cell near base, shortly then rapidly diverging.....Sterrhinæ.
   Hind wings, 8 joined with cell at base, then subparallel with it.....Monocteniinæ.

Ennomidæ.

1. Hind wings, 8 coalescing with cell at base.....Fernaldellinæ.
   Hind wings, 8 separate from cell.....2.
2. Frenulum absent.....Palyadinæ.
   Frenulum present.....3.
3. Antennæ nearly joined at base.....Sphecetodinæ.
   Antennæ normally placed.....4.
4. Antennæ three-fourths length of fore wings; legs very long.....Mecoceratinæ.
   Antennæ never more than two-thirds length of fore wing; legs normal.....5.
5. Fore wings, 7 separate from 8 and 9.....Melanchroiinæ
   Fore wings, 7 stemmed with 8 and 9.....Ennominæ.

From this group is excluded the sub-family of Strophidiinæ, now constituting the family Epiplemidæ. They are sufficiently removed from the typical forms of Geometridæ to warrant this perhaps, by the want of humeral angle at the base of vein 9 on the hind wings, and, in the case of Callizzia, by the broadening of the inner margin of the hind wings, which, when the insect is at rest, is rolled round the body, in the manner of the Tineoidea, the upper half overlapping it, while the fore wings are extended at right angles, as in most Geometridæ.

Starting with the sub-family of Hydriominæ, I have amalgamated with it the Dyspteridinæ, a sub-family established by Dr. Hulst, upon the supposed absence of the frenulum, in certain species. Finding that this appears to be constant in only two of his species, and that in the Ennomidæ the same feature occurs, I have determined to abandon its use, as showing when absent merely a tendency toward degeneration (as in the Sterrhinæ and Geometrinæ, by the partial obsolescence of the hind legs), and not worthy of basic consideration.

The Brephinæ find a final resting place at the close of the family of Geometridæ, for by the presence of vein 5 in the hind wings they belong with this series, and the presence of hair pencil on hind tibiæ of ♂ in *Brephos infans* (an observation I have not seen recorded) fixes beyond further question their family relationship.

The Ennominæ remain an unwieldly mass, but afford no characters which I can detect, that are stable enough to warrant more than generic separation.

Hydriominæ.

Beginning with Paleacrita, the genera can be arranged in a sequence which is natural both as to structure and venation. The wingless female gradually develops into one fitted for flight, while the male degenerates in alar expanse, especially on the hind wings, the series reaching a full development in both se[illegible] A synopsis of the genera will be given at the clos[illegible]ib-family.

I have dropped [illegible] Agia, genera founded by Dr. Hulst, the former upo[illegible] *a limitata*, and the latter on a species previously [illegible]ckard as *Lobophora viridata*. Dr. Packard's species, [illegible] true Lobophora, but belongs under Nyctobia.

The genus Talled[illegible] Hulst, falls because the type *montanata*, Pack., is [illegible]urt. The supposed absence of hair pencil on the [illegible]lst separated it, is an error. It is present and very conspicuous, but lies in a cavity between the thorax and abdomen beneath. Probably Dr. Hulst looked for the sheath or groove in hind tibia, where it usually rests, and finding none, supposed the hair pencil was wanting.

The genus Opheroptera, Hub., should be dropped, the only species under it, *O. boreata*, having been very doubtfully catalogued by Staudinger, from Greenland, many years ago.

(To be continued.)

CORRECTION.

In the November number of this Journal, page 333, Dr. Ashmead has described a parasite of the Grape-berry moth, giving the scientific name of the moth as *Eudemis bortana*. The specific name should be *botrana*. This European name has been applied to the American Grape-berry moth by all writers since 1870, but as Mr. W. D. Kearfott and myself have just demonstrated in Bulletin 223 from the Cornell Agricultural Experiment Station, and also in the Transactions of the American Entomological Society for December, 1904, the American insect is specifically distinct and easily separated from the European Grape-berry moth. We find that the American Grape-berry moth should bear the name of *Polychrosis viteana*, Clemens. The European *Eudemis botrana* is not known to occur in this country, and the parasite was bred from the American species, so the title of Dr. Ashmead's description should be corrected to include the American name of the Grape-berry moth and not the European.

M. V. SLINGERLAND.

PRELIMINARY LIST OF THE MACRO-LEPIDOPTERA OF ALBERTA, N.-W. T.

BY F. H. WOLLEY DOD, MILLARVILLE, ALTA.

(Continued from Vol. XXXIII., p. 172.)

It is now over three years since I published a list of Albertan butterflies under the above title. The list gave promise "to be continued," and it was fully intended at the time to publish the continuation the same year, but for a variety of reasons it had to be postponed. The delay, however, has not been without advantages. Not only have a number of species come to hand that had not been recorded here up to that time, but many that were then standing under names by which I had known them for years, have been found to be wrongly named, and several of them have been described as new species. Closer study, too, of long series, has resulted in a better understanding of nearly allied forms; and it is hoped that some of the notes here appended, though they have no claim to perfection, will enable some obscure species to be more easily separated than they have been hitherto. At the same time, I much regret that I have not been able to make more comparison of local material with that from other districts. Not only has it been hard to spare the time which much exchanging calls for, but it has often proved a very difficult, if not impossible matter, to get by exchange some of the commonest species, their very commonness seeming to render them, so to speak, scarce, at least in collections. I hope, however, to pay more attention to exchange in the future, and when more forms from other localities have come to hand the result of their study, and comparison with their Alberta representatives will probably be published from time to time.

Of the radical changes that have taken place in classification since my list of butterflies was published, enough has been said. Of the two recently published North American lists, I have preferred to follow that of Prof. Smith, as it seems to me to give a better arrangement of the Noctuidæ, or at least of the species in their respective families, and it is the Noctuidæ that have always been my favourite group. Though I am doubtful as to whether the term is any longer recognized, or if so, just where the line is drawn, I have included all the old-time "Macros," meaning thereby those genera which used to be known in European lists fifteen years ago as Sphinges, Bombyces, Geometræ, Cuspidatæ, and Noctuæ. Though I still study them as with the "larger fry," the Hepialidæ at any rate have been eliminated from their former position, as

have also the Cossidæ, and of the impending removal of the latter to the "Micros," it is quite fifteen years since I first heard the suggestion. In the present list I have attempted considerably more in the way of study than I did in the butterflies. I have made more comparisons and exchanged a far greater amount of correspondence. In one instance, that of Cosmia, I have taken the liberty of du uthors of all our recognized standard works, and bel f the synonymy, by some- one who has seen the d Walker, to be necessary. This decision is only a into the matter, a study of a considerable quantity of old world as well as from the new, and correspondence lists who were able to give me information on the subject ever, that in this, as well as in other points concernin come rather too hastily to conclusions. I am indet mith and Drs. Ottolengui and Dyar for the names of m es, Notodontidæ, and a few other families allied thereto. The list of these is not a long one, but I am rather inclined to think that their apparent scarcity may be due to the fact that, in this district at any rate, they are of quiet and retiring habits, and do not often show up. It is to the Noctuidæ that most attention has always been paid, and Prof. Smith has been unceasing in his assistance to me in this group. I am also most fortunate in being in correspondence with Sir George Hampson, of the British Museum, where, of course, a very large number of types are to be seen, and the sending to him of a number of species, with the names by which I have known them, has resulted in the detection of many errors which would probably have otherwise still been overlooked. The first instalment of the Noctuidæ has quite recently been published in Vol. IV. of his "Catalogue of the Lepidoptera Phalænæ in the British Museum," and as a very large number of North American species are therein figured, many of them for the first time, it proves a valuable aid in the determination of species. Dr. Holland's "Moth Book," too, has supplied a long-felt want. In all works of the above kind, however, the practice of sometimes figuring the male of one species and the female of another very closely allied to it, is rather to be deprecated, as it is apt to give the impression that a merely sexual difference is really specific, there not unfrequently being less difference in facies between two species in the same sex than there is between the two sexes of either. It must be borne in mind that in making comparisons between closely allied species, my opinions are based on superficial characters, and I have almost com-

pletely ignored genitalic differences claimed by Prof. Smith. It is, I think, for superficial characters that most of us naturally look, and though the "genitalia test" is doubtless of the highest value as an aid, I am not aware that its infallibility is an accepted fact. I have not, however, studied the matter, and am quite willing to accept it at its estimated worth. The genus Euxoa is perhaps the most difficult in all the Noctuidæ to understand. Species run so very close together, and vary so tremendously *inter se* that it is often almost impossible to tell where one ends and another begins. It is probable that many groups in this genus will never really be made much of without careful breeding from known females. The matter is intricate enough in dealing only with material from one locality, but when geographical variation has to be taken into account, I believe there is hardly a genus in all the Lepidoptera in which species are harder to define. In the Noctuidæ I have given references to all published figures of western species known to me elsewhere than in the works of Dr. Holland and Sir George Hampson.

Unfortunately, not much attention has as yet been paid to the Geometridæ in this district. But though for that reason records have not been very carefully kept, the notes and dates given, as far as they go, have been very carefully prepared, and may be relied upon as being tolerably accurate. The Rev. G. W. Taylor has recently commenced a special study of the whole group, and through his kindness at least half of those here listed are now named, which could not have been named three years ago owing to there then being no one working on them that I knew of. Amongst those that I had at that time named, it turns out that the late Dr. Hulst had made several peculiar errors. The names I now give are all on the authority of Mr. Taylor, and the (??) are his also.

It is often a difficult matter to decide whether to put down a species as "common" or "rare." The majority of species seem to have their special seasons or series of seasons; and favourable or unfavourable conditions for existence seem sometimes to show their effects on an entire genus. Almost every year something or other turns up in some numbers that has always been considered a great rarity, or else never before been met with at all, and *vice versa*. Every moth-collector of experience must know, too, how sometimes a species shows up rather freely for one or two nights only, though to all appearance on the preceding and succeeding nights the conditions are practically the same.

All captures, unless otherwise expressly stated, refer to the district near the head of Pine Creek, about eighteen miles south-west of Calgary.

The "Billings's mill" locality, ten miles further west, in the spruce timber, has been described in my preface to the butterflies. "Blackfalds" is, I believe, intended to refer to the same general locality as "Lacombe" in the butterflies. A type specimen referred to as "at Washington," means that it is in the U. S. National Museum at that place, and "at Rutgers College" signifies Prof. J. B. Smith's collection. It has been a common error in the past amongst describers of species to record a large percentage of material taken on British territory, between Winnipeg and the Pacific, as coming from "B. C." Incidentally, the geographical error is not confined to entomologists, as "B. C." is erroneously engraved upon the door-key tags, menus, etc., at the C. P. R. chalet at Laggan. The eastern boundary of British Columbia is, I believe, the summit of the Rocky Mountains, 5 or 6 miles west of Laggan. In one instance among the many corrections of the error that I have made in this paper, the actual locality mentioned (Roundthwaite) as being in "B. C." is actually about 650 miles distant therefrom as the crow flies. There are several types referred to "B. C." which I rather suspect of coming from Manitoba or the North-west Territories, though I am quite unable to trace them.

SPHINGIDÆ.

95. *Hemaris diffinis*, Bdv.—Common at flowers of wild gooseberry. End May and June. Larva on snowberry.

96. *Lepisesia flavofasciata*, Walk.—One fine ♀ near Billings's lumber mill, June 5th, 1898.

97. *Deilephila galii*, Rott., var. *chamænerii*, Harr.—Common at flowers of bergamot, wild gooseberry, etc., at dusk. June and July.

98. *D. lineata*, Fabr.—Rather rare at cultivated "pinks" and other flowers at dusk. My specimens are all from near mouth of Fish Creek. I think I have seen it on the hill prairie occasionally. July.

99. *Sphinx Vancouverensis*, Hy. Edw., var. *albescens*, Tepper.—Not rare, flying at dusk, or at rest in daytime. June and July.

100. *Smerinthus Jamaicensis*, Dru., var. *geminatus*, Say.—Rather common flying round willow bushes after dark, and at light. June and July.

101. *S. cerysii*, Kirby.—Not at all common. Same method of capture as preceding species. June.

SATURNIIDÆ.

102. *Samia Columbia*, Smith.—Probably fairly common, but it seems to me to be more of a prairie than a foothill species. I have only 4 ♂

specimens taken at light, one of which has been labelled *Columbia* by Prof. Smith. They agree pretty well with the figure of that species in Dr. Holland's book, but lack the reddish shading of the outer band there shown, which shading, as mentioned in the text, is supposed to be characteristic of *Gloveri*. I cannot, however, detect it in his figure of the latter species. I have a pair sent me from the States, but without data, labelled *Gloveri*, which have certainly a very faint purplish shading in outer band, but the central band has less of a purplish tint, and in this respect they are quite unlike Dr. Holland's figure of *Gloveri*. The specimens are a good deal larger than mine, but otherwise their distinctness does not satisfy me. However, comparison with specimens from an unknown locality is eminently unsatisfactory. I have occasionally found empty cocoons of a *Samia* on Salix near the head of Pine Creek (*i. e.*, in the hills), but never with larvæ, and rarely with imagines. It is rather more common about ten miles further east, near the mouth of Fish Creek, but the only time I tried "assembling" with a ♀ there I met with no success, probably through ignorance of the correct time for flight. It is a fairly regular, though not common, visitor to the Calgary electric lights, and I have occasionally been brought specimens taken in houses in the town.

During a trip made down the north bank of the Bow River in 1899, I noticed larvæ that I took to be *Columbia* common in some spots on osier growing on the river banks. Dr. Fletcher has bred moths from larvæ from the Lacombe district which he tells me are "more like *Gloveri* than my conception of *Columbia*." He reports that the larvæ at Lacombe feed on *Elæagnus argentæa*, but I have never observed them on that shrub myself.

SYNTOMIDÆ.

103. *Scepsis fulvicollis*, Hbn.—A single specimen at head of Pine Creek, flying in sunshine, July 25th, 1898, and another on Red Deer River bottom at snowberry flowers, in sunshine, about July 7th, 1904.

LITHOSIIDÆ.

104. *Crambidia casta*.—Not rare at light. Middle Aug. to middle Sept.

105. *Hypoprepia miniata*, Kirby.—Two specimens only, a ♀, Blackfalds (near Lacombe), Alta., Aug. 1st, 1902 (Gregson), and a ♂, head of Pine Creek, July 25th, 1903, at light, the latter named by Dr. Dyar. Both are quite fresh specimens.

NOLIDÆ.

106. *Celama pustulata*, Walk.—Not rare, at light and dusk. July.

ARCTIIDÆ.

107. *Eubaphe aurantiaca*, Hbn., var. *rubicundaria*, Hbn.—Common flying in sunshine. End of June and July. I have only seen a single ♀.

108. *Dodia Albertæ*, Dyar.—Described from Calgary. Probably not rare in the spruce some seasons, though I have only taken two specimens from near Billings's lumber mill in early July. These are the diaphanous gray form referred to in the description. A third, taken at head of Pine Creek on June 11h, 1900, by Mr. Hudson, is the specimen there mentioned as being washed with white, and which I had looked upon as a distinct species. Type 5747, U. S. Nat. Mus., has been divided. The left wings are in the National collection mounted on a slide, and the rest of the specimen is in my own collection. Though I have looked out for it, I have not met with the species since 1900. At rest it resembles Eubaphe in form.

109. *Estigmene acræa*, Dru.—Common in the town of Calgary, and probably on the prairies eastward. A few specimens were taken at head of Pine Creek during 1903, but as the species had not been observed there previously, they may have been the progeny of live ♀ ♀ brought by Mr. Hudson or myself from the town. June.

110. *Neoarctia Beanii*, Neum., Laggan (Bean).—Described from there, I believe. I have a single specimen from Mr. Bean, July 9th, 1900, bred from larva on willow; var. *fuscosa*, Neum., is from the same locality.

111. *N. yarrowi*, Stretch.—A single specimen was taken on Aug. 18th, 1902, on the bare summit of Mt. Niblock., near Lake Agnes, Laggan, at an altitude of about 8,000 feet, by Dr. Wm. Barnes.

112. *Phragmatobia fuliginosa*, Linn.—A single ♀ flying in sunshine, May 27th, 1894.

113. *Arctia caja*, Schrank., var. *Wiskotti*, Staud.—Mr. Sanson records "var. *Utahensis*" from Banff. The name stands in the latest lists as a synonym of *Wiskotti*.

114. *Hyphoraia lapponica*, Thunb.—Occasionally in the hills at light, rest, or flying in sunshine. Fairly common during 1902, and at dusk in 1904. Middle June and July.

115. *Apantesis virgo*, L.—A single ♂ taken at light, July 22nd, 1903, is apparently typical. A pair from Blackfalds, July 1st and 2nd, 1902, have, Mr. Gibson tells me, the markings on secondaries much heavier than in the eastern form. These are the only Albertan specimens I have seen. Mr. Gregson reported the larvæ of this species to be abundant at Blackfalds during 1903. Mr. Arthur Gibson records the species from Edmonton, in Northern Alberta.

116. *A. virgunc̆ula*, Kirby.—Two ♂ ♂ and a ♀ are all the specimens I have ever seen here. They were taken in different years. End of June and July.

117. *A. michabo*, Grt.—A single ♀, at rest, June 9th, 1893.

118. *A. parthenice*, Kirby.—Not common at light in some seasons. The only ♀ ♀ I have taken have been bred from larvæ picked up haphazard. Middle July to middle August. The secondaries of the ♀ are of a much deeper red than in the ♂, and in one specimen the white markings on primaries have a very decided reddish tinge.

119. *A. oithona*, Strk., var. *rectilinea*, French.—Recorded from Calgary by Mr. Willing, on the authority of Mr. Gibson.

120. *A. Quenselii*, Payk., var. *turbans*, Christoph.—This species, which formerly passed as a miniature *virgunc̆ula*, used to be very common, more especially east of the hills, eight or ten years ago. The larvæ, which fed on Galium, might then be captured in some numbers in holes dug for fence posts, and left open for twelve hours or so. Of late years it has been far less common, but has come occasionally to light. None of my specimens have the orange secondaries mentioned by Mr. Gibson in his paper on this genus (CAN. ENT., XXXV., 144).

121. *A. obliterata*, Stretch.—A single male, at light, head of Pine Creek, Aug. 15th, 1901. This, which I believe is the only specimen of the form known, is referred to in CAN. ENT., XXXV., 144, and figured on Pl. 5 of that vol. It is still in my collection. It differs from any of my *turbans* in having rich orange secondaries instead of yellow, two additional discal spots, and a dark dash near and parallel to the inner margin. I never suspected it of being distinct from *turbans* until Mr. Gibson's paper was published, and fancy it will eventually prove to be but a variety of that species.

122. *A. Bolanderi*, Stretch?—Mr. Gibson referred a ♂ (May 24th, 1897) and three ♀ ♀ doubtfully to this form, which Dr. Dyar treats as a synonym of *Blakei*. I have a similar ♂ dated June 3rd, 1903, and a third has been taken during June of the present year. Two of my ♀ ♀ I have always taken to be *determinata*. The other ♀ and the ♂ ♂ I have been inclined to consider distinct, on account of the much earlier date, lighter build, less hairy vestiture, and greater intensity of black on primaries. I have *Blakei* from Colorado, which at any rate can hardly be the same species as mine, from which it differs in being a stouter insect, broader winged, with more hairy thoracic vestiture, having four transverse bands

on primaries instead of two, longer and rather more heavily pectinated antennæ, and much less black on secondaries. Of my ♂ Mr. Gibson said, "May be *Bolanderi*, but may simply be a variety of *determinata*." I hardly think it is the latter.

123. *A. Nevadensis*, G. & R., var. *incorrupta*, Hy. Edw.—So far I have only taken two ♂ ♂ and two ♀ ♀, July 7th to Aug. 6th. The ♂ ♂, on Aug. 6th, were taken at Calgary town lights. A third ♀, June 28th, 1899, has primaries marked as *incorrupta*, but has pure black secondaries and a black body. I have two ♀ *Nevadensis* from Glenwood Springs, Colo., which look quite a different species. In fact, they come very much nearer to *Blakei*, from the same locality, than to Calgary *incorrupta*, specimens of which have been seen by both Dr. Dyar and Mr. Gibson.

124. *A. Williamsii*, Dodge, var. *determinata*, Neum.—Common. End of June and July. In one specimen there is no trace of the 3rd transverse band (= typical *Williamsii* ?), and the 4th and W marks are very faint. I have no ♀ ♀, unless those mentioned above under *Bolanderi* belong to this species. The ♂ antennæ are sometimes variegated, black and cream.

125. *A. celia*, Saund.—Banff, June 16th (Sanson). On the authority of Mr. Gibson. I have never to my knowledge seen a specimen.

126. *A. sp.*—A series of nine specimens have been a puzzle alike to Mr. Gibson and Dr. Dyar. Seven ♂ ♂ and one ♀ were taken near Billings's lumber mill on June 19th and 26th, 1898, and a ♀ is from Blackfalds, taken by Mr. Gregson on Aug. 9th, 1902. I believe the series to represent one extremely variable species. Four ♂ ♂ somewhat resemble *Williamsii* in maculation, but are smaller and much blacker. Two ♂ ♂ and two ♀ ♀ are like miniature *virgunc̆ula*. I have not taken the species for several seasons.

127. *Parasemia plantaginis*, Linn.—Not common on creek bottoms on the hill-prairie. Common in the spruce and westward to the mountains. End June and July. I have specimens like all the varieties listed in Dyar's and Smith's lists except *Geddesi*. An interesting article on Laggan *petrosa*, by Mr. Bean, will be found in CAN. ENT., XXVII., 87, and Fl. II.

128. *Halisidota maculata*, Harr.—A single ♂ at light, June 25th, 1898, was all I ever saw of this species until last year (1903), when I found the decidedly conspicuous larvæ common on different species of poplars in gardens in Calgary. These pupated in September, and moths emerged in the house at the end of February of the present year.

PERICOPIDÆ.

129. *Gnophæla latipennis*, Bdv., var. *vermiculata*, G. & R.—A single specimen at Lacombe, July 27th, 1900, in sunshine, on a flower head (P. B. Gregson). I have seen the specimen. The name is on the authority of Dr. Fletcher, who says that the species has never before been recorded north of Colorado.

AGARISTIDÆ.

130. *Androloma MacCullochii*, Kirby.—Rare near Calgary, probably more common in the mountains. June 19th (worn), Billings's lumber mill; Laggan (fresh), July 17th to 25th; and (worn) Aug. 8th. Taken flying in sunshine.

131. *Alypia Langtonii*, Couper.—Common in the spruce, less so in the poplar woods on Pine Creek. End May and June.

NOCTUIDÆ.

132. *Acronycta Canadensis*, Smith and Dyar.—Very rare; four specimens only, 2 ♂ ♂, 2 ♀ ♀, June 15th to July 6th. I don't think any actual description of this has ever been published, but a Calgary ♀ (now the type) is mentioned in Smith and Dyar's Monograph, where the form is referred doubtfully to *insita*, Walk. Material sent Prof. Smith from here later confirmed his opinion as to the validity of *Canadensis* as a species. He returned me a ♀ "like ♀ type, but better marked," and a ♂ with maculation scarcely traceable. Taken at treacle. The type is in the U. S. National Museum.

133. *A. cretata*, Smith.—A ♂ June 22nd, 1901, and a ♀ July 6th, 1896, both, I believe, at treacle. Prof. Smith has seen the ♀. With so little material at hand, I am not in a position to question the distinctness of these two Calgary forms. I can only say that my *cretata* looks to me like my *Canadensis*, with much stronger and blacker maculation, and whiter and less powdered ground colour. I submitted to Sir Geo. Hampson the ♀ *Canadensis*, "like type," which was still labelled "*insita*, var. *Canadensis*," and a ♂ which closely resembled my ♀ *cretata* returned by Prof. Smith. His verdict was: "Your *insita* is quite a different species from Walker's *insita*, of which we have the type. It is *lepusculina*, Gn., ♀, and your *cretata* is the ♂ of it." My ♀ *cretata* is, however, exactly like Smith and Dyar's figure, and my ♂ is evidently the same species. The type is in the U. S. National Museum collection at Washington.

134. *A. Manitoba*, Smith.—A single ♀ July 1st, 1898, at treacle, which Prof. Smith has seen. It resembles Smith and Dyar's figure, but has paler primaries, and secondaries are somewhat smoky outwardly.

[NOTE.—The text refers to this figure as a ♀, but mentions the existence of two ♂ ♂ only.]

135. *A. quadrata*, Grote.—Has been fairly common some seasons at treacle. June and July.

136. *A. revellata*, Smith.—About the same as *quadrata* in dates and numbers, etc. Formerly referred to *grisea*.

137. *A. tartarea*, Smith.—Described in CAN. ENT., XXXV., 127 (May, 1903), from a ♂ taken at treacle near Calgary, on June 23rd, 1898, the only specimen I have ever seen. I had supposed it to be a dark *revellata*. The specimen is in the U. S. National Museum.

138. *A. illita*, Smith.—A single ♂, which Prof. Smith says is "more powdery than usual," at treacle on the Red Deer River, about fifty miles N. E. of Gleichen, June 20th, 1901, rather worn.

139. *A. emaculata*, Smith.—(Dyar's list, No. 1038, omitted from Smith's list in error). Common at treacle in "Acronycta" seasons, June and July. Larvæ on Salix and Rosa. I think the type is a ♂ from Calgary, and is in the Rutgers College collection. Formerly sent out as *impressa*.

140. *Apharetra pyralis*, Smith.—Described from Calgary. Very rare, one ♂ and three ♀ ♀ being all I ever took, July 13th to Aug. 23rd. Pl. XIII., fig. 11, in Smith and Dyar's Monograph, is the ♀ type, and not fig. 12, "male adult," as there stated. The specimen is figured also in Ent. News, VI., No. 10, Pl. XV. The type is in the U. S. National Museum at Washington.

141. *Hadenella tonsa*, Grt.—Redescribed partly from Calgary material as *subjuncta* (CAN. ENT., XXX., 323, Dec., 1898), and sent out by me previous to that as "*Bryophilid*, sp." Fairly common at treacle some years. July. The type of *subjuncta* is in the Museum at Washington.

142. *Caradrina extimia*, Walk.—July and August. Common.

143. *Caradrina miranda*, Grote.—Not common. Treacle and light. Middle June to middle July. Sir Geo. Hampson says it is "larger and darker than the typical form," so the species may perhaps be *nitens*, Dyar (CAN. ENT., XXXVI., 29, Feb., 1904).

144. *C. punctivena*, Smith.—Not at all common. June and July, treacle. One of the ♂ types is stated to be from "McLean, B. C." McLean is in Assiniboia, and 450 miles in a straight line from the B. C. boundary. Prof. Smith thinks that this may prove to be synonymous with *rufostriga*, Pack.

145.—*Hillia senescens*, Grt.
146. *H. vigilans*, Grt. } Both very rare previous to 1903, when I took about a dozen specimens of each at treacle in September. The form Prof. Smith calls *vigilans* is dark red, and except for the s. t. line and discoidal spots, almost unicolorous, with conspicuously pale whitish collar. *Senescens* is ochreous, tinged with reddish, and with all the maculation evident. I had always believed them distinct, but until last year had not sufficient material to enable me to press the point. I have now submitted a series of each to Prof. Smith, and he considers that the names must now stand for distinct species. The species sent out by me in some numbers seven or eight years ago as *crassis* turned out to be *Mamestra obscura*, a species somewhat similar in type of maculation to my *vigilans*, but without pale collar, and smaller and blacker. A ♂ taken on Aug. 1st, 1896, of size and general appearance of *vigilans*, but almost entirely black, with unicolorous collar, may perhaps have been the true *crassis*. Unfortunately this specimen was completely destroyed in transit to Rutgers College, and still requires to be duplicated. Breeding might prove *senescens* and *vigilans* dimorphic forms of one species, but I very much doubt it.

147. *H. algens*, Grt.—Generally distinctly rare, but, in company with the two foregoing species, fairly common at treacle last year, evidently a "Hillia" year. As a matter of fact, the other two species confined themselves to those fence posts treacled on a creek bottom, while *algens* seemed rather more fond of those on the hillside. September.

148. *Hadena (Luperina) niveivenosa*, Grt. Very rare. End July and August.

149. *H. (L.) passer*, Grt.—Very rare. End June and July.

(To be continued.)

NOTE ON MACRONOCTUA ONUSTA, GRT.

The larvæ of this Noctuid moth were again found at Ottawa the past season, in beds of Irises, on the grounds of the Central Experimental Farm. They were not, however, at all numerous, and did not do any appreciable harm this year. Two larvæ were collected on July 28, one of which was inflated; the other pupated on Aug. 1, the moth emerging on Sept. 7. Another larva was found on Aug. 4, the moth appearing on Sept. 15. The pupa of the former specimen was much larger than any of those obtained in 1903, an account of which appeared in the last Annual Report of the Entomological Society of Ontario. This pupa measured 30 mm. in length and 7.5 in width. ARTHUR GIBSON.

ON THE SYSTEMATIC POSITION OF THE ÆGIALITIDÆ.

BY H. F. WICKHAM, IOWA CITY, IOWA.

The family Ægialitidæ, then known by but one species, was placed by Dr. LeConte (Classification of the Coleoptera of North America, p. xxxvi.) in association with those Heteromera having the anterior coxal cavities closed behind. This structure is also assigned to *Ægialites* in the detailed account of the insect on page 388 of the same work. Dr. Sharp, in his recent treatise on insects (Cambridge Natural History, Vol. VI., p. 265), speaks of the anterior coxæ as being "completely closed in," while Dr. Geo. Horn, though dissecting a specimen for a study of the mouth-parts, seems to have overlooked the coxal structure, or he would certainly have alluded to it in his notes on the genus (Trans. American Ento. Soc., XV., p. 27). In view of the statements in the books, I was surprised, a few months ago, by the receipt of a letter from the Rev. J. H. Keen, in which he asserted that the cavities of the anterior coxæ are open behind, as is indeed the case. Mr. Keen's observation is of great importance, in that it opens the way to a proper appreciation of the systematic position of the insect.

Having been supplied with specimens of *Ægialites Californicus*, Mots. (*debilis*, Mann.), by Mr. Keen, and of *Æ. Fuchsii*, by Mr. Fuchs, I have been able to make careful dissections of both, and find that in neither case do the epimera reach the tip of the prosternum. There is thus left a gap of some extent, though the posterior aspect of the cavities is not open for its entire width as it is in *Pytho*. This being true, it becomes necessary to make a change in Dr. LeConte's table, removing Ægialitidæ from proximity to the Tenebrionidæ, and transferring them to group 4. Here they may be placed next to the Pythidæ, with which they agree in so many respects in larval as well as adult characters, and from which they may be distinguished by the greater number of ventral abdominal segments, there being six of these in *Ægialites* and but five in the Pythidæ.

To my mind, the sequence of Heteromerous families adopted in the LeConte and Horn "Classification" is not satisfactory, the Pyrochroidæ being too far removed from the Pythidæ. These families seem to me to be quite closely related, and I prefer the view presented by Dr. Sharp (l. c., p. 266), whereby they are placed in juxtaposition. If now, we place the Ægialitidæ between the Melandryidæ and the Pythidæ, I think we shall

have an arrangement that will do little violence to the affinities of these four families, as far as our present knowledge of the larval and adult structures allows us to judge.

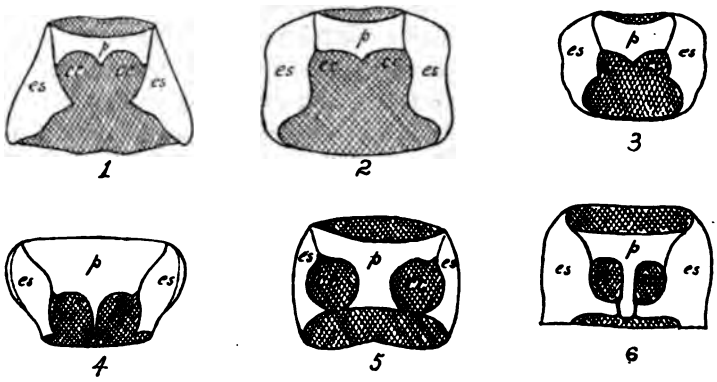

FIG. 10.

In order that the characters alluded to may be more readily appreciated, I have prepared sketches (Fig. 10), showing the structure of the under side of the prothorax in the Melandryidæ, Pyrochroidæ, Pythidæ, Ægialitidæ and Tenebrionidæ. 1 represents *Melandrya striata*; 2, *Pyrochroa flabellata*; 3, *Pytho Americana*; 4, *Lecontia discicollis*; 5, *Ægialites Californicus*; and 6, *Nyctobates Pennsylvanica*. All are lettered alike, *p* indicating the prosternum, *cc* the coxal cavities, and *es* the thoracic side pieces, the sutures between the episterna and epimera being obliterated or indistinct.

THE BEE-GENUS APISTA, ETC.

When writing (p. 330) on the genus *Apista*, F. Smith, 1861, I unfortunately overlooked the fact that the generic name is long preoccupied (*Apista*, Hübn, 1816, and the similar *Apistus*, Cuvier, 1829). The bee-genus from Brazil may therefore be known as *Egapista*, n. n., type *Egapista opalina* (*Apista opalina*, Smith).

I find that the name of the African bee-genus *Serapis*, F. Smith, 1854, is also preoccupied (*Serapis*, Link, 1830); it may be changed to *Serapista*; type *Serapista denticulata* (*Serapis denticulatus*, Smith).

The name *Eumorpha* proposed by Friese for a group of bees, is also preoccupied. The group *Rhodocentris*, Friese, includes the type of the prior *Heterocentris*, Ckll.; so the latter name must be used for the group, unless (as seems probable) it can be divided. T. D. A. COCKERELL.

THE NYMPH OF *GOMPHUS FURCIFER*, HAGEN.

BY E. M. WALKER, B. A., M. B., TORONTO.

On the 18th of June, 1904, while collecting dragon-fly nymphs in Grenadier Pond, Toronto, I found two *Gomphus* exuviæ resting on the surface of a thick growth of algæ a few feet from the edge of the pond. I examined the debris and black swamp mud from the bottom, just below the spot where the skins were taken, and found one nymph about two-thirds grown, apparently of the same species. On June 20th I found another exuvia on a similar part of the shore, and on examining the bottom I found several half-grown nymphs and one full-grown one, which was crawling along the surface of the algæ, evidently ready to transform. In the evening a male *Gomphus furcifer* emerged.

Since then I have taken several half-grown nymphs, but as the season for transformation was apparently over I got no more mature ones. All of the nymphs were found in the surface mud, at a depth of about one or two feet of water, the shore being low and marshy. I have kept one of the nymphs alive ever since.

The imagoes of *Gomphus furcifer* are not rarely taken in the country surrounding Grenadier Pond, and I have one female from De Grassi Pt., Lake Simcoe. It has always been considered an uncommon species, and the nymph was hitherto unknown.

FIG. 11.—Nymph of *Gomphus furcifer*. (Enlarged 1½ diameters.)

Nymph of *Gomphus furcifer* (Figs. 11 and 12).

Body elongate, depressed, covered with minute dense brownish scurfy pubescence; the legs very sprawling. Abdomen lanceolate, broadest at the fourth segment, the lateral margins as far as the apex of segment 8 regularly convex; segments 9 and 10 very long and narrow, together equal in length to segments 6, 7 and 8. Segment 8 nearly twice as broad at base as at apex, about two-thirds as long as segment 9. Segment 9 about three-fifths as broad at apex as at base, about as long as segment 10 with the appendages. Segment 10 equal in breadth throughout. Small lateral spines are present on segments 8 and

9, very minute on the former; otherwise the lateral margins are smooth and free from hair. Dorsal surface of abdomen as far as base of segment 6 evenly convex from side to side with a very faint median ridge, along which is a faintly impressed line; beyond this the ridge is somewhat more distinct and the sides slope more abruptly. The "scars," or irregular bare patches, on the dorsal surface of the abdomen are conspicuously marked on segment 1–8, and are represented on 9 by a pair of distinctly impressed lines. Width of metathorax about equal to that of the first abdominal segment. Wing-cases extending a little over the base of the fourth abdominal segment. Legs thinly fringed on both anterior and posterior margins with rather long hairs, except the posterior margins of all the tibiæ, which bear a rather dense fringe. Antennæ with the third joint about one-third longer than the first and second joints together, slightly broader at apex than at base. Mentum of labium about one-third longer than broad and a little more than two-thirds as broad at base as at apex, contracted in its basal two-fifths. Median lobe distinctly produced, the anterior border convex and bearing on its margin a dense fringe of short flat, light brownish hairs, in the midst of which at the apex is a pair of very small, shining, dark brown teeth, which are seen with some difficulty. Lateral lobes with the outer margins very convex, apex with a prominent hook and about six other nearly equidistant teeth along the inner margin, the basal one very small, the others prominent and of about equal size.

FIG. 12.—Labium, from beneath, of *Gomphus furcifer* nymph.

Total length, 33 mm.; abdomen, 22.5 mm.; hind femur, 6 mm.; width of head, 5.75 mm.; of abdomen, 7 mm.

NOTE ON HAPLOA CONTIGUA, WALK.

When I was working on the Haploas, previous to the publication of my paper on "The North American Callimorphas" (CAN. ENT., XIX, 181–191), I appealed to Mr. A. G. Butler for information in regard to Walker's types, and he very kindly sent me sketches of the types of *Contigua* and *Confinis* as then standing in the British Museum collection, but as what was shown as the former was practically the same as the latter, I wrote that I thought there must be some mistake, and sent a drawing of what we, in this country, understood to be *Contigua*. Mr. Butler, in replying,

said I was quite right, and that Mr. Walker, with his usual carelessness, had got the *Contigua* label on the wrong specimen, and thanked me for calling his attention to the error, which he had corrected.

At the Annual Meeting of the Ent. Soc. of Ont., 26th and 27th October this year, I saw for the first time the D'Urban collection of moths deposited in November, 1871, in which I found a specimen of *Contigua* marked *Confinis* in Walker's handwriting, as confirmed by Dr. Bethune. This shows that Walker had confused his own species of these moths very badly.

HENRY H. LYMAN, Montreal.

POGONOMYRMEX OCCIDENTALIS.

On page 351 of this magazine Professor Cockerell notes his observation of the *Pogonomyrmex occidentalis* at Ruleton, within twelve miles of the western limit of Kansas, and considers this as the indication of the eastern limit or beginning of the arid region. Our investigations of the range of this large ant in Kansas have shown us that its eastern limit is found far to the east of the point mentioned. The species occurs as far east in this State as the Sixth Principal Meridian, or in the counties of Republic, Ottawa, McPherson and Sedgwick, on a line about two-fifths of the length of the State from the eastern border. One would scarcely be acquainted with climatic conditions in Kansas who should consider this ant as a mark of the "arid region," as west of the line indicated are found some of the best farming lands of the State. Especially is this true of the wheat lands, as the counties named are among those famous for the production of this cereal. Notwithstanding its occasional occurrence along the extreme eastern limit above indicated, the favoured home of the species is really within the western hundred miles of the State, and thence west to the mountains, where in specially suitable localities it sometimes occurs in astonishing abundance. From its habit of clearing about its mounds a considerable space of vegetation, this ant is not liked by farmers, and various measures have been taken to destroy it, one of the most successful being the pouring into the centre of the formicary, opened for the purpose, a quantity of carbon bisulphide, the opening being then closed to retain the fumes, which finally penetrate to the depths of the burrows, destroying the inmates. As these cleared spaces sometimes attain the diameter of twenty-four feet, and as the hills may occur a few rods apart, it will be seen that the ant is not a desirable occupant in cultivated fields. However, it is well known that regular cultivation of the soil of infested fields is a great deterrent to their occupation by the Pogonomyrmex, perhaps less through the dislodgment of well-established colonies than through the discouragement of new ones. Thus it comes to be true that in fields properly handled the ant ceases to be a general pest, and the few large colonies are readily destroyed by the means above indicated. The species is therefore economically of less importance than is sometimes believed.

E. A. POPENOE, Manhattan, Kan.

Mailed December 15th, 1904.

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CORRIGENDA.

Page 144, line 19, for "Spring methods" read "Spinning methods."
Page 333, line 2, for "BORTANA" read "BOTRANA."

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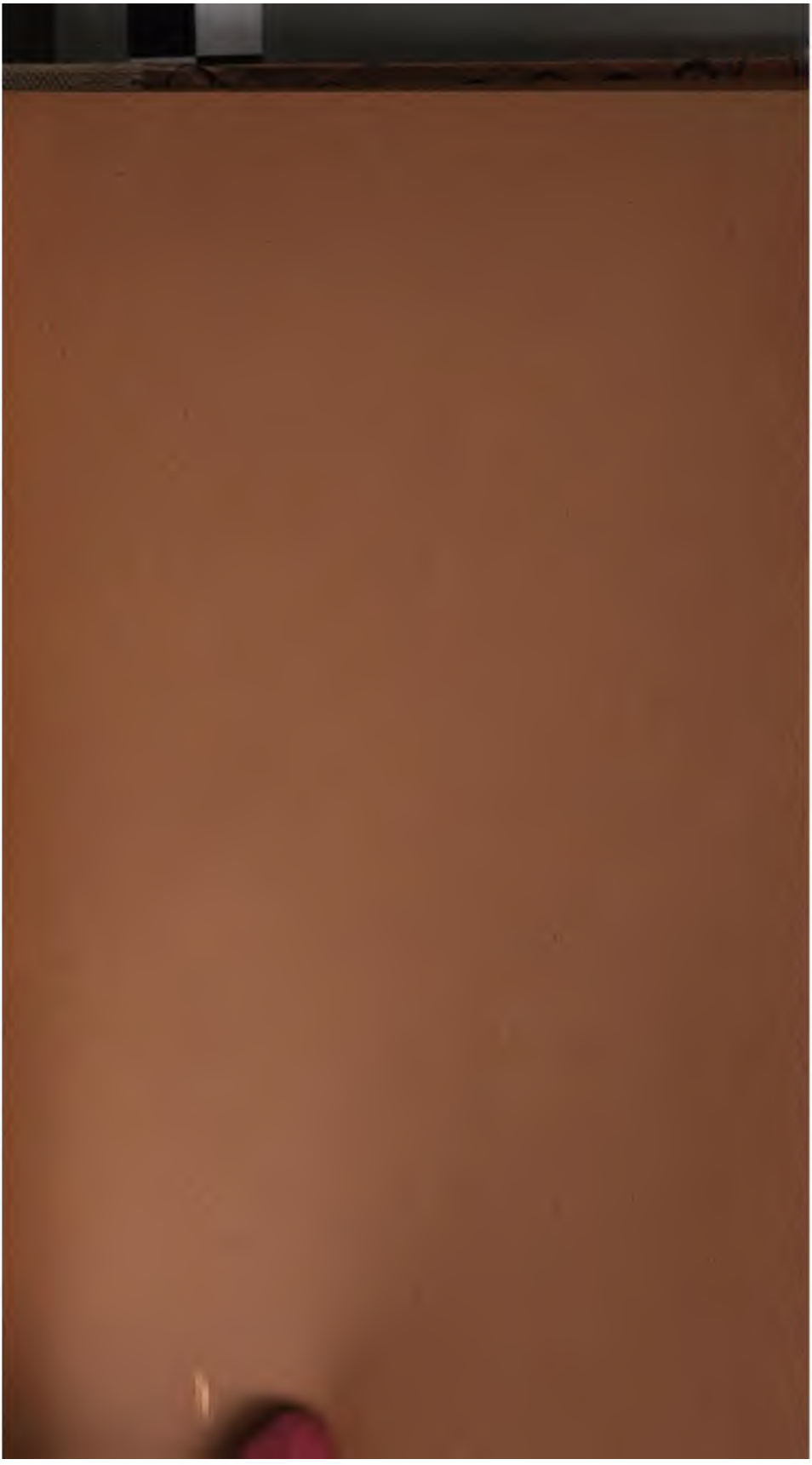

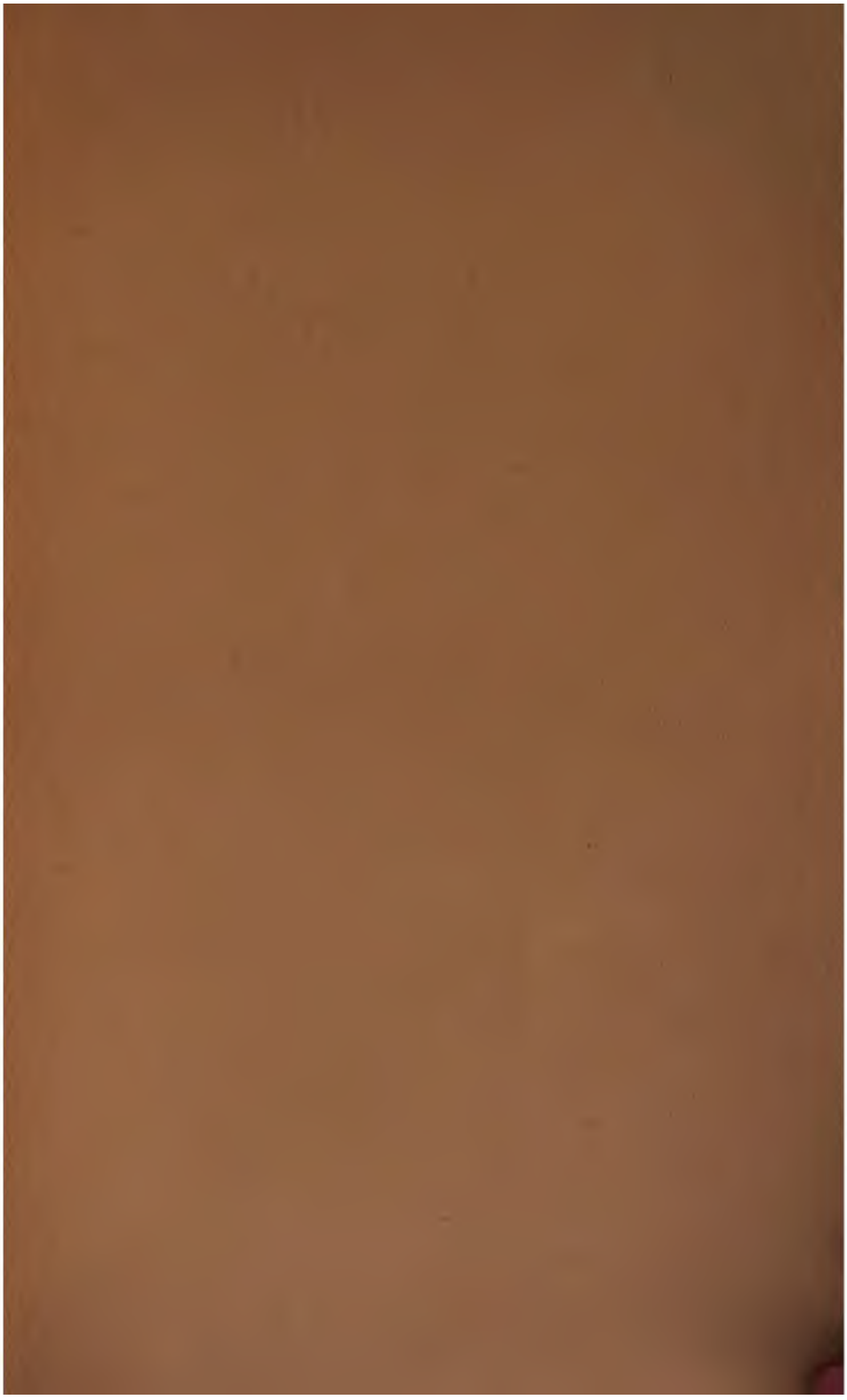

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